CORNELL UNIVERSITY TURFGRASS TIMES

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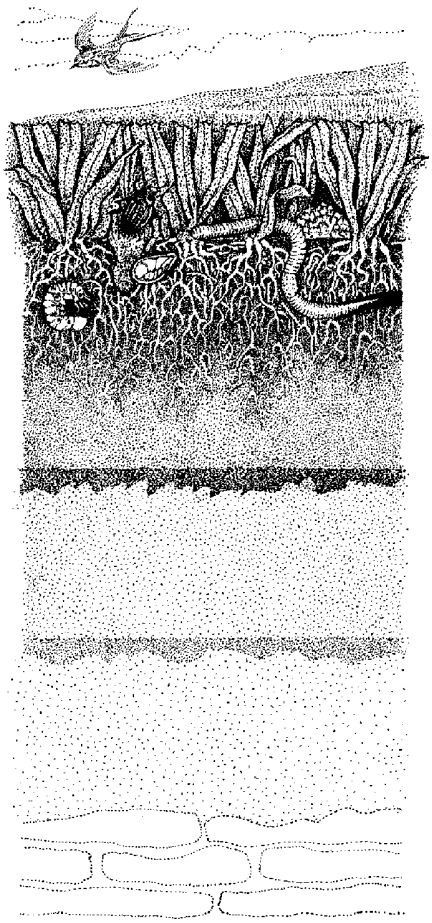

Ecological Aspects of Crabgrass Infestation in Cool-Season Turf

Crabgrass *(Digitaria spp.)*, a seed propagated summer annual grass species, is considered one of the most important weeds in turf management systems. Many studies have been focused on herbicide control, however, research on the biology and ecology of crabgrass is conspicuously absent, especially information on the ecological aspects influencing the infestation in turf. Understanding these factors could lead to improved crabgrass management strategies.

The purpose of this study was to determine the effects of open space (gap size), thatch layer and soil temperature on crabgrass infestation in turf. ■

Materials and Methods

Field experiments were conducted in 1996 on a mature stand of turf-type tall fescue *(Festuca arundinacea)*. Experiment A was on a site with a history of heavy smooth crabgrass infestation, and Experiment B was on a site without a history of infestation.

Four different sized gaps of 2.5 to 20.0 cm diameter were created on April 15 by spot treatment with 2.0% (v/v) Finale (glufosinate); and the closed gap (0.0 cm gap) was 10 x 10 cm area. After turf died in Experiment B, half the gaps were disturbed by removing dead grass and thatch and replacing the area with soil. Three grass weed species, smooth crabgrass *(D. ischaemum)*, large crabgrass *(D. sanguinalis)* and goosegrass *(Eleusine indica)* were overseeded on May 22 in each gap. All plots were arranged in randomized complete block design with 5 replications and mowed biweekly at 2.5 inch height with the clippings removed. Each gap size was maintained by clipping the encroaching leaf blades once a week.

Seedling emergence rate and tiller development were recorded weekly from May 1 to August 23. Seedheads of each species were counted weekly in August. Soil temperatures at 2.5 and 5.0 cm depth were continuously monitored from May 24 to July 19 at 30 minute intervals with in-ground thermocouples and a CR10X Measurement and Control Module (Campbell Scientific, Logan UT).

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This Times

Short Cutts

Safety In American Football *is a valuable text for opening a dialogue within a community where administrators, athletic directors, coaches, and sports turf managers need to coordinate activities to maximize safety on football fields.*

The NYS Turfgrass & Grounds EXPO, featuring former Washington Redskin quarterback and football analyst, Joe Theismann, returns to Syracuse November 4-7.

Winning Fields

The New York State Turfgrass Association (NYSTA) in cooperation with the Cornell Turfgrass Program and the Association of Superintendents of Buildings and Grounds continued a tradition of reaching new audiences with the 1997 Sports Turf Tour: *Winning Fields.*

Over 100 sports turf and grounds managers from across the state attended the two premier locations at Dutchess Stadium and on the campus of SUNY Potsdam. Lively and interactive training sessions on sports turf management included topics ranging from fertilization and watering, to Integrated Pest Management (IPM) and communication. The faculty was led by John Liburdi, town of Colonie, and Kevin Trotta, North Rockland Schools; with Dominic Morales, program leader at SUNY Delhi, and Dr. Frank Rossi, Extension Specialist with the Cornell University Turfgrass Team. NYSTA is planning another *Winning Fields* sports turf tour for 1998.

Safety in American Football

A symposium held in 1994 by the American Society for Testing and Materials (ASTM) culminated in the publication of a book titled, *Safety in American Football.* This text, edited by Earl F. Hoerner, is a compilation of scientific review articles presented at the symposium which focused on understanding and minimizing the risk associated with the game of American Football.

There is something for everyone who might be associated with the game of football in this text, from coaches training and communication, to certifying protective equipment, to field standards and performance. This is a valuable text for opening a dialogue within a community where administrators, athletic directors, coaches, and sports turf managers need to coordinate activities to maximize safety. The section on managing the field surface includes researchers from Penn State, Michigan State and Texas A & M. This is a text filled with loads of technical material and data that address issues such as peak deceleration, degrees of rotation and shear resistance when studying surface traction. Copies are available from the ASTM, 100 Barr Harbor Dr., West Conshohocken, PA 19428.

The 1997 New York State Turfgrass and Grounds EXPO is Set!

The Turfgrass and Grounds EXPO is returning this November to Syracuse, NY for the first time in over a decade to the brand new OnCenter Convention Center and the historic Hotel Syracuse. Headlining the conference is former Washington Redskin quarterback and ESPN's #1 football analyst, Joe Theismann.

The 1997 EXPO has expanded educational offerings from industry leaders from around the world to address issues important to turf managers in the northeast. One day seminars include golf course reconstruction and renovation with renowned architect Craig Schriener; sports turf management techniques with safety gurus Floyd Perry and Dave Mellor of the Milwaukee Brewers; and a full day on turfgrass irrigation systems with GCSAA seminar instructor Brian Vinchesi. Other program highlights include a session on alternative pest management on the golf course with Dr. Joe Vargas and Cornell's own Dr. Eric Nelson; and a session on the new bentgrasses with superintendents growing the upright bents.

For lawn and landscape managers, there will be a session on marketing a natural look with native plants and trees for low maintenance, followed by Audubon International representatives who will discuss the backyard and school yard sanctuary program. In addition, there will

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Tall Fescue Seed Inhibits Clover Infestation

A research group in Arkansas investigated the influence of germinating seedlings of tall fescue *(Festuca arundinacea)* on the growth and development of several clover species. This work was conducted in a forage management situation with a forage type tall fescue cultivar and five clover species including white clover *(Trifolium repens)*.

Standard methods of determining the allelopathic effects of one species on another were utilized, i.e., extracts of one species were introduced into pots where the weed species was growing. This was not conducted under field conditions. Still, this is not the first report of allelopathy with tall fescue species. Several years ago another research group in Arkansas identified the influence of turf type tall fescue cultivars on crabgrass infestation. No peer reviewed report is available from those studies.

Allelopathy is the influence of one species on the growth of another species. This influence can be physical, as in the shading of light or being under debris, or it can be chemical where one species exudes a chemical that alters the growth of another species. This research on tall fescue identified a subtle effect of endophyte-infected tall fescue on the growth of clover. As concern over the use of pesticides grows, an improved understanding of these types of plant interactions will be essential to maintaining high quality, functional turf stands.

(From: T.L. Springer. 1996. Allelopathic Effects of Germination and Seedling Growth of Clovers by Endophyte-Free and Infected Tall Fescue. Crop Science 36:1639-1642.)

Seed Priming

Turfgrass establishment from seed is both the most critical time in the life of a stand and also the hardest to control the many variables associated with success. Germination time, seedling emergence and seedling development all influence the species and possibly the cultivars that will be selected. Kentucky bluegrasses have been difficult in this vein resulting from their extended time of establishment (up to 4 to 6 weeks). Therefore, seed priming, which is a preplant treatment that alters the hydration process of germination and subsequently reduces the establishment time, is being investigated.

Seed priming can be accomplished using an osmoticum such as salt or polyethylene glycol (PEG), or through solid matrix priming (SMP) with compounds that have a high water holding capacity such as soft coal, leonardite or sphagnum moss. An experiment was conducted at Penn State University to investigate the viability of SMP as a means of enhancing cool-season turfgrass (bluegrass, ryegrass and tall fescue) establishment. Field experiments indicated that success of SMP treatment was dependent on species and cultivars. Still, the researchers concluded that SMP seed could be desirable under cool periods when seedling emergence would be reduced or for quick establishment.

In a separate experiment conducted on Kentucky bluegrass, SMP seed did not directly increase seedling growth rate, however, seedlings were larger. Again, this could be desirable for enhanced establishment under suboptimal conditions.

(From: I. Yamamoto, A.J. Turgeon, and J.M. Duich. 1997. Field Emergence of Solid Amtrix Primed Turfgrasses and Seedling Emergence and Growth of Solid Matix Primed Kentucky Bluegrass Seed. Crop Science 37:220-229.)

Scanning the Journals

A review of current journal articles

Research on tall fescue identified a subtle effect of endophyte-infected tall fescue on the growth of clover.

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Short Cutts

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be a four hour session with political consultant Edward Grefe discussing strategies for organizing a grass roots movement to influence pesticide policy. Brian Detzler will cross the border from Canada to discuss how he reduced pesticide use 98%, improved quality and reduced costs for the city of Waterloo parks system. Finally, Neil Diboll, an internationally recognized expert who is widely quoted in *Horticulture* and *Better Homes and Gardens* on low maintenance meadow and prairie landscapes, will offer a half day session.

New this year is the Early Bird Session on Wednesday from 6:30 to 8:00 am. The conference committee headed by Jon Fik of Hobart and William Smith College works for years in advance to bring the finest education in the world to New York State. The conference will be held from Tuesday, November 4 to Friday, November 7. For more information contact the NYSTA office at (800) 873-8873.

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Crabgrass

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Results and Discussion

Experiment A: site with natural smooth crabgrass population.

Smooth crabgrass seedling emergence occurred on May 24 regardless of gap sizes, however, significantly more seedlings emerged in the gaps compared to the closed gap (Figure 1).

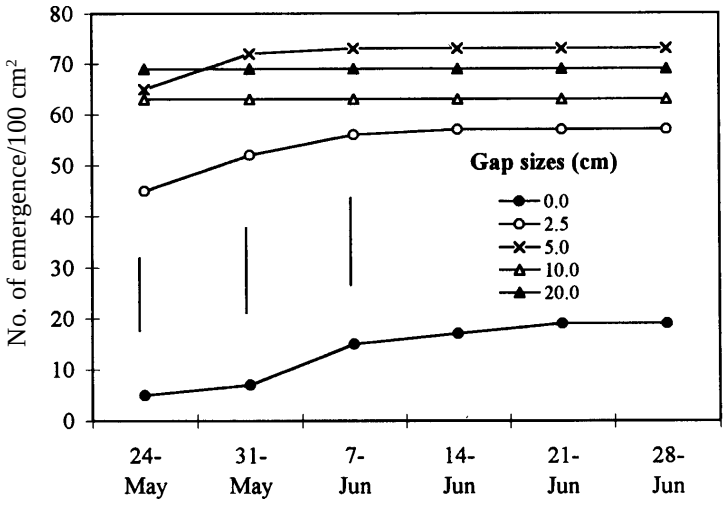


Figure 1. Cumulative seedling emergence of smooth crabgrass in the gaps of cool-season turf. Vertical bars represent LSD at P=.05 for comparison of the means on each date.

There was no significant difference in the number of emerged seedlings between 2.5 and 20.0 cm gap. Seedlings emerged over the period of 4 weeks in closed gap, but among the gaps, seedling emergence was completed in a week. All emerged seedlings in the gaps survived to seedhead production. Therefore, tall fescue turf with a history of smooth crabgrass infestation does not require open space for further infestation.

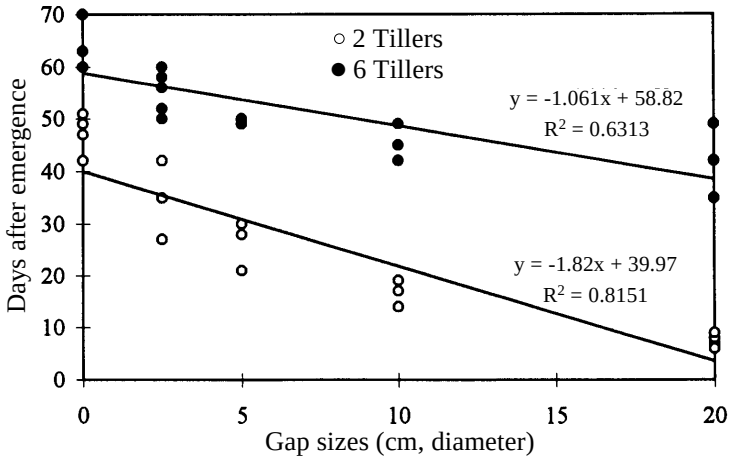


Figure 2. The days after emergence to 2 and 6 tillers of smooth crabgrass seedling in different gap sizes of cool-season turf.

Tiller development was highly correlated with the gap sizes, with more rapid tillering rate in the larger gaps. As a measure of this, timing interval from seedling emergence to 2 tillers was 40 days in closed gap compared to 10 days in the largest gap (Figure 2). This suggests that the timing of postemergent herbicide treatments should be more critical in an open turf than a dense turf area because the emerged seedlings more rapidly achieve a size that is difficult to control.

The daily mean temperatures in 0 to 20.0 cm gap were not substantially different from each other, however, the daily temperature fluctuations were significantly different with the largest gap recording the lowest and highest in a day. (Figures 3 and 4). These results suggest that temperature differential could be more important than mean temperature when predicting the emergence and development of crabgrass in turf. Additionally, current modeling approaches using mean temperature without considering the effect of daily temperature fluctuation could lead to important errors in predicting the behaviors of weeds under different environmental conditions.

Experiment B: site without weed infestation.

Thatch layer significantly affected the seedling emergence and development of smooth and large crabgrass and goosegrass. Gaps with thatch had less seedlings emerge compared to gaps without thatch (Figure 5). Seedling emergence of smooth and large crabgrass among the gaps were similar to the result in Experiment A (i.e. less seedlings emerged in closed gap). Interestingly, goosegrass seeds failed to emerge in closed gap. Seedhead production of smooth and large crabgrass was not significantly influenced by gap sizes, still less goosegrass seedheads were produced compared to crabgrass. These results suggest that dense turf could exclude seed-propagated weed species, and also reduce the amount of the seeds in turf in subsequent years.

Conclusions

These data confirm the paradigm that dense turf will exclude seed-propagated weeds. However, it also illustrates that weed species differ in the minimum turf density required to prevent weed infestations.

Current models based on daily mean temperature may not be valid for predicting seedling emergence of smooth crabgrass in turf.

The prevention of weed seed germination and inhibition of seedling growth and development are active components of this competitive relationship.

Tae-Joon Kim, Frank Rossi and Joseph Neal
Cornell University Turfgrass Team

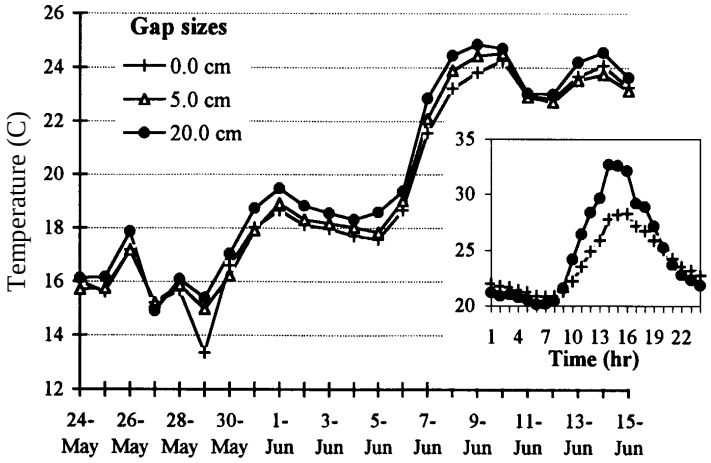


Figure 3. Daily mean temperature at 2.5 cm soil depth of different sized gaps in cool-season turf. The inset shows hourly temperature during June 9 under both gaps.

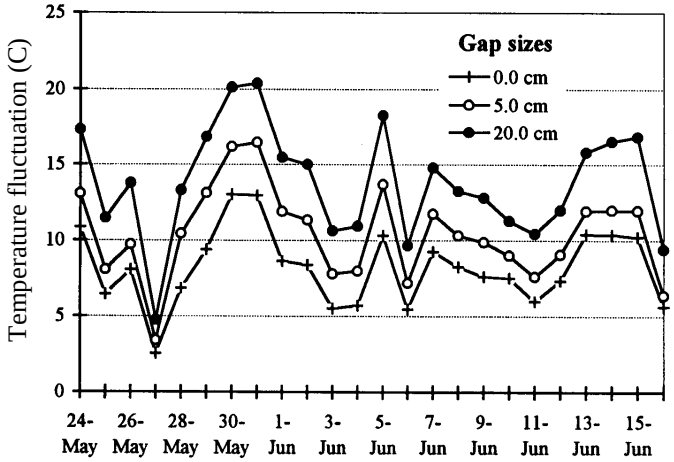


*Figure 4. Daily temperature **differential** at 2.5 cm soil depth of different sized gaps. Smooth crabgrass emergence observed on May 24.*

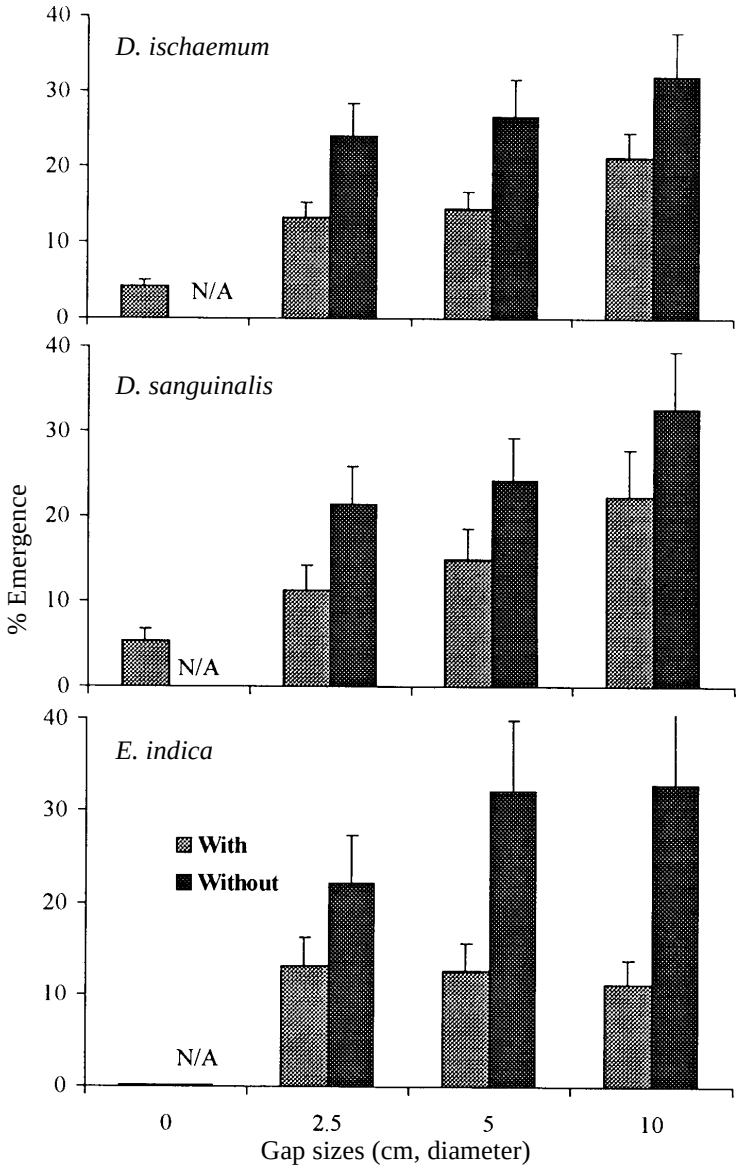


Figure 5. Seedling emergence of each species in different sized gaps with and without thatch of tall fescue turf. Vertical bars represent SE of the means.

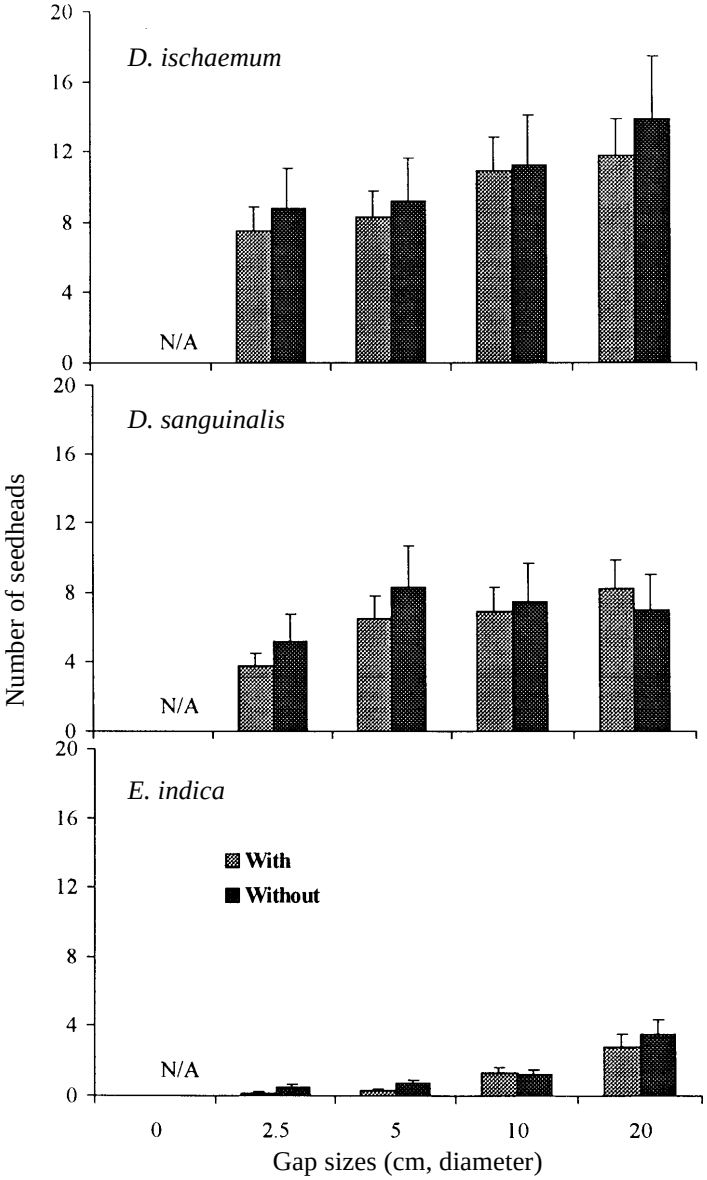


Figure 6. Seedhead production of each species in Site B (no history of infestation) in different sized gaps with and without thatch of tall fescue turf. Vertical bars represent SE of the means.

Keys To Unlocking Motivation In Turfgrass Industry Employees

By learning and following the 10 keys to unlocking employee motivation, the manager can improve employee work performance and job satisfaction.

Every manager wants to know what specific things can be done to motivate his or her employees. There are many practical things that a turf manager can do every day to create a motivational work environment. Let's look at some specific things you can do to motivate your employees. Think of them as keys to unlocking employee motivation. By learning and following these 10 keys, you can improve employee work performance and job satisfaction.

Key #1: Provide Praise and Positive Feedback

A turfgrass manager should never underestimate the power of sincere praise and appreciation as a motivator. We all need to be appreciated, needed and valued by others. Sincere appreciation expressed to employees for their accomplishments makes the individual feel good and want to continue to perform at a high level. All too often managers reprimand and provide negative feedback without taking the time and effort to look for the things that employees are doing well and to praise them. The issue of giving employees positive and negative feedback can be viewed as an "emotional bank account." Praise, recognition and feedback represent deposits in the emotional bank account. Conversely, constructive criticism or reprimands can be viewed as withdrawals from the emotional bank account. It is obvious from this analogy that if the supervisor is continually correcting or reprimanding an employee and providing minimal, if any, positive feedback, praise or appreciation, the result is being "overdrawn" on the emotional bank account. Employees can accept reprimands and constructive criticism if they are confident that their work truly is appreciated and that they are making a contribution to the organization.

All too often managers reprimand and provide negative feedback without taking the time and effort to look for the things that employees are doing well and to praise them. Sincere appreciation expressed to employees for their accomplishments makes the individual feel good and want to continue to perform at a high level.

Key #2: Delegate Responsibility

The delegation of responsibility and authority in itself is a powerful incentive to produce motivated employees. As a manager's responsibility grows and develops, the use of delegation is critical to accomplish more through people and to provide for employees' personal growth and development. Many managers find delegation difficult for a variety of reasons. The manager has to relinquish some control over how things are done. There is a tendency to feel that if responsibilities are delegated, the manager becomes less important. It is important for turfgrass managers to remember that delegation of power is not a zero-sum game. In other words, if the manager delegates some power to an employee, it doesn't mean that the manager has less; what it really means is that through delegation, the entire organization has more. The more people are empowered to accept responsibility, the greater the potential for unlocking the talent of each individual. Delegation of responsibility and authority to make decisions, however, should not be given lightly. The employee must show the ability and desire to accept new responsibilities and, most importantly, it must be clear to both the manager and the employee that the employee is accountable for carrying out the assigned responsibilities.

Key #3: Help Employees Set Goals

Researchers Locke and Latham have clearly shown that employees who have work-related goals accomplish more than those employees who do not. Research has also shown that it does not matter if the employer sets the goal or the employee sets his or her own goals, the most important issue in goal setting is that an attainable goal is set. It should also be remembered that, when the employee sets the goals there is usually more commitment to those goals. Another issue in goal setting is that employees tend to set more difficult goals than they can reasonably achieve. Working with employees to set realistic and rewarding goals results in greater motivation. It is the achievement of challenging yet attainable goals that provides the motivation for the next work assignment.

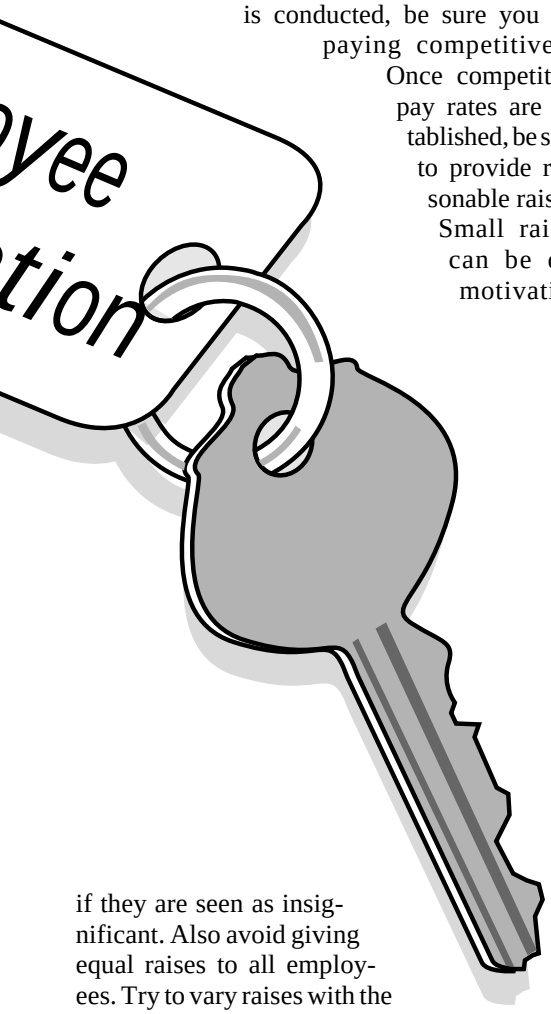
Key #4: Provide Encouragement

At first, providing encouragement may sound a lot like providing praise and positive feedback. However, there is an important difference. Praise and positive feedback is given after someone has achieved something valuable and worthwhile in their work; in short, after someone has done a good job. Encouragement, on the other hand, comes prior to someone tackling or completing a challenging task. Employees who feel that their supervisor has confidence in them and strongly supports their efforts in completing

a tough assignment are far more likely to have the confidence to complete the assignment than an employee who is not encouraged and supported by his or her supervisor.

Key #5: Make Careful Use of Compensation

Clearly there are times when increases in pay for good performance or an increase in benefits will be particularly appreciated by an employee, especially in a case where compensation is provided as a reward for performance. Conduct salary surveys of other employers in your area to determine what different positions are paying relative to your own. A salary survey can be as simple as a series of phone calls to help determine what competitors are paying in the current season. After the salary survey is conducted, be sure you are paying competitively. Once competitive pay rates are established, be sure to provide reasonable raises. Small raises can be demotivating



if they are seen as insignificant. Also avoid giving equal raises to all employees. Try to vary raises with the performance of individuals or the importance of the job. Above all, try to develop compensation as much as possible as a reward system for good performance.

Key #6: Recognize the Best Employees with Promotion or Advancement

Some facilities are large enough to provide several steps on a career ladder over time. On other facilities, the maintenance staff is smaller and there is relatively little room for formal job advancement. Regardless of whether the staff is large or small, attempts should be made to offer advancement where it is feasible. In a larger organization, it is often possible to promote a good worker to a better position. In a smaller organization, perhaps the advancement would take the form of skill development. For example, there is a certain amount of prestige and status which comes from operating larger, more advanced mowers and pieces of turf equipment. Training a good performer to operate more expensive and sophisticated pieces of equipment is, in itself, a form of elevation in responsibility and can be a strong motivator.

Key #7: Make the Individual's Job as Meaningful as Possible.

Mundane, repetitive and simplistic work often leads to monotony and boredom for the person who has to do it. Try to include some new assignments along with the basic routine work. Some managers rotate jobs so an individual is not doing the exact same job every single day. Provide learning opportunities that allow employees to grow and develop a sense of pride in their work. Finally, one of the most important ways to create meaningful work in the turf industry is to clearly let employees know why they are doing a particular job and why it is important to the course and to the people who play the course. Employees who feel that the tasks that they do each day are valued by someone have more pride in their work and greater motivation.

Key #8: Provide the Best Working Conditions Possible

Working conditions can have a major impact on how happy and satisfied people are in their work. The fact that turfgrass maintenance is outdoor work attracts many people to the job. However, not all aspects of outdoor work are desirable at all times. Weather conditions, for example, can have a major impact on employee morale and productivity. Consider the employee who attempts to do his job during the fifth day of a heat wave in the middle of the summer, or the employee who is only half as productive in rainy weather as he is in good weather. Make adjust-

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Researchers have clearly shown that employees who have work-related goals accomplish more than those employees who do not.

Mundane, repetitive and simplistic work often leads to monotony and boredom. Try to include new assignments along with basic routine work. Rotate jobs so an individual is not doing the exact same job every single day. Provide learning opportunities so employees can grow and develop a sense of pride in their work. Employees who feel that their tasks are valued by someone have more pride in their work and greater motivation.

Employee Motivation

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By tuning in to difficult working conditions and trying to make adjustments to improve those conditions, turfgrass managers greatly improve staff morale and productivity.

Look for ways that employees can have input in decisions that affect their work. Nobody knows more about how to do the job, or improve it, than the person who does it every day.

A truly motivated staff does not happen by accident. It results from an increased understanding of motivational principles. In addition, it requires constant effort and continuing communication with employees.

ments in working conditions whenever and wherever possible to improve employee morale and productivity. Be sure all workers have the protective clothing they need: rain gear, gloves for heavy work or respirators when they are using pesticides or other toxic material. Be sure equipment is in good repair and is easy to operate.

Work hours are also considered a part of working conditions. Allowing employees flexible work times that meet their personal schedules can be a major motivator. Also, allowing for work to start earlier on days of extreme heat or other weather conditions can make a difference. By tuning in to difficult working conditions and trying to make adjustments to improve those conditions, golf course superintendents and supervisors greatly improve staff morale and productivity.

Key #9: Involve Employees in Decision Making

Employee involvement can be a powerful motivational tool. It is not appropriate to involve employees in making every decision regarding turfgrass maintenance; many decisions only the manager can make. For example, major equipment purchases and budget preparation are decisions commonly made by the manager and possibly some supervisory staff members. However, it is important to look for ways that employees can have input in decisions that affect their work. Employee involvement can lead to improvements that management would not have implemented or even thought of on their own. Nobody knows more about how to do the job, or improve it, than the person who does it every day. Create a climate at your facility where comments, feedback and ideas on how to do a better job are encouraged. For example, some employers have even created bonus programs to reward employees for cost cutting or productivity suggestions that are implemented.

Key #10: Minimize Weaknesses and Maximize Strengths

Even the most outstanding employees have weaknesses with which they struggle. They have work that they dislike or do not feel that they do very well. Effective managers become aware of the weaknesses and patiently try to address those weaknesses with the employee slowly over a period of time. At the same time, they continue to emphasize and focus on an employee's strengths, by encouraging and praising the employee based on their strengths. Belittling or focusing unduly on weaknesses can affect self-esteem and productivity. Most managers have to work at trying not to over-focus on an employee's weaknesses.

Summary

A truly motivated staff is not something that happens by accident. It results from an increased understanding of motivational principles on the part of course superintendents and supervisors. In addition, it requires constant effort and continuing communication with employees.

Today's modern workforce is much more likely to be motivated by the motivation factors identified by Herzberg, including a feeling of personal accomplishment, achievement of increasing responsibility, a sense of importance to the organization, and involvement in decision making.

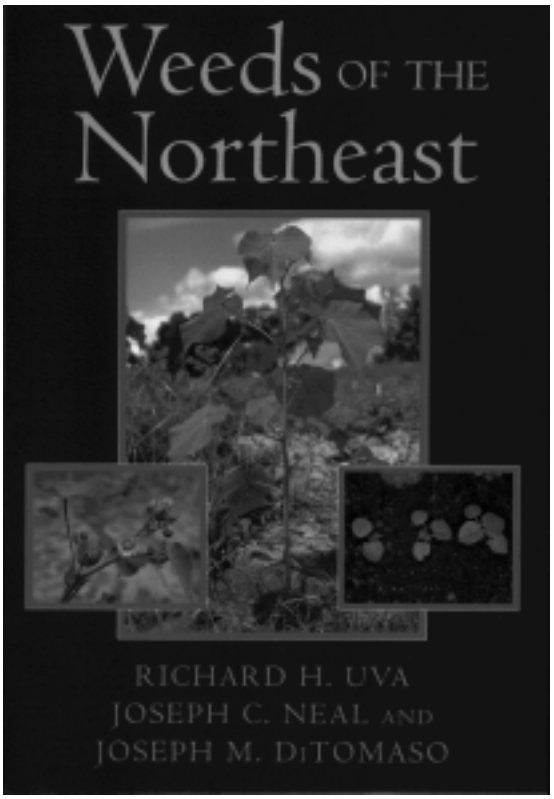
It is your role as a manager to create this environment where employees will be motivated through considering the wants and needs of your employees, offering praise and encouragement, implementing an effective compensation strategy, and making employees' jobs meaningful. Those who invest the time in understanding and implementing motivational principles receive substantial rewards in the form of employee job satisfaction and productivity.

THOMAS R. MALONEY, SENIOR EXTENSION ASSOCIATE
CORNELL UNIVERSITY TURFGRASS TEAM

Weeds of the Northeast

A Cornell doctoral candidate and two former members of the Cornell University Turfgrass Team have joined together to produce a lavishly illustrated manual on weeds of the Northeast.

The new book, *Weeds of the Northeast*, by Richard H. Uva, Joseph C. Neal and Joseph M. DiTomaso makes for easy identification of 299 weed species that infest agronomic and horticultural crops, turfgrass areas, nurseries, gardens, and noncrop areas such as landscapes and roadsides. The book covers a wide region of the country running south to Virginia, north to Maine and Southern Canada, and west to Ohio and Wisconsin.



Based on vegetative rather than floral characteristics, this practical guide gives anyone familiar with plants the ability to identify common and economically important weeds before they flower. It also serves as a handy reference book for those aspects of weed biology and ecology important to weed management.

To facilitate both easy access to information about a species and easy comparison among species, the authors have adopted a standardized format of species descriptions

A dichotomous key to all the species described in the book is designed to narrow the choices to a few possible species. Specific identification can then be confirmed by reading the descriptions of the species and comparing a specimen with the drawings and photographs.

One particularly useful feature is a fold-out grass identification table that provides diagnostic information for weedy grasses in an easy-to-use tabular key.

Additionally, a shortcut identification table enables rapid identification of specimens with unusual vegetative characteristics, such as thorns, square stems, whorled leaves, or milky sap.

The first comprehensive weed identification manual available for the Northeast, this book will facilitate appropriate weed management strategies in horticultural or agronomic cropping systems. It is equally valuable to home gardeners and landscape managers, as well as pest management specialists and allergists.

Identification of weeds is enhanced by 746 color photographs, 118 drawings and 17 tables spread throughout the book's 416 pages. It is published by Cornell University Press and is an alternate selection of the Garden Book Club. Partial funding for the project was provided by the New York State Turfgrass Association.

Much of the information in the book, and the way it is organized and presented, is derived from Richard Uva's master's thesis. Uva extended his information in collaboration with former Cornell professors and weed specialists Joseph Neal, now Associate Professor of Weed Science at North Carolina State University, Raleigh; and Joseph DiTomaso, Associate Weed Specialist at the University of California, Davis. Andrew F. Senesac, Weed Science Specialist for Cornell Cooperative Extension at the Long Island Horticultural Research Laboratory, Riverhead, was a key contributor to the book.

Weeds of the Northeast may be found at many bookstores or ordered directly from Cornell University Press, PO Box 6525, Ithaca, NY 14851-6525, (607) 277-2211). The cost is $29.95 (paper) or $60.00 (cloth).

The first comprehensive weed identification manual available for the Northeast makes for easy identification of 299 weed species that infest agronomic and horticultural crops, turfgrass areas, nurseries, gardens, and noncrop areas such as landscapes and roadsides.

For ordering information call (607) 277-2211

The Field Day is a wonderful opportunity to touch base with Cornell's extensive turf activities in an efficient one-day format.

Cornell University's Turfgrass Program announces its summer Field Day to be held at the Turfgrass Field Research Laboratory in Ithaca on Tuesday August 26, 1997.

The popular annual event gets underway at 8:00 am and features educational sessions, a trade show, an electronic technology demonstration, diagnostic exercises, a turf quiz, Integrated Pest Management techniques, and soil testing demonstrations.

Following a famous Cornell-recipe chicken barbeque luncheon, the afternoon session will tour current research projects including plant growth regulators, physical soil amendments and pesticide leaching, nematodes for grub control, microbial ecology of composts, nontarget effects of fungicides, personnel management, safe storage of pesticides, crabgrass control, selecting bluegrasses, and bentgrass establishment.

Cornell's turfgrass program is dedicated to developing efficient turfgrass management systems based on sound scientific research information. Emphasis is placed on improving cultural management by increasing stress tolerance; providing a greater understanding of turf pest ecology to reduce pesticide usage and minimize environmental impacts; and establishing a core educational curriculum delivered by emerging and traditional strategies to meet the current and evolving needs of the turf industry and society at large.

Preregistration before August 11 is $30. After August 11, the registration fee is $40. The fee covers all events and materials. The Field Day is a wonderful opportunity to touch base with Cornell's extensive turf activities in an efficient one-day format. The event is sponsored by the Cornell Turfgrass Program in cooperation with the New York State Turfgrass Association. New York State DEC pesticide credits will be available.

For further information, contact Kelly Woodhouse at (607) 255-3090.

Make your plans now to attend Cornell's Turfgrass Short Course in January 1998.

Short Cutts

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Cornell Turfgrass Short Course

"The Tradition of Excellence Continues"

The cornerstone of the Cornell Turfgrass Program's outreach efforts is the intensive two week experience known as the Cornell Turfgrass Short Course. Over the last 12 years the course has grown in quantity and quality of information presented and boasts over 800 alumni around the world. This is a must-attend event for turfgrass managers new to the industry as well as for managers who have never had formal training. It serves as a comprehensive review of topics ranging from the basic scientific principles of grasses and soils, to the research behind turfgrass and environmental management practices. Specific case study work is developed for golf turf, sports turf and lawn care managers integrating the concepts learned during the course with practical experience from industry leaders and students. As a result of the overwhelming response to the January course in Ithaca on the Cornell campus, a second two week session is being held on Long Island in late February. If you'd like more information on the Short Course, contact Kelly Woodhouse at (607) 255-3090.

Turfing The Net

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were developed for producers of field-grown nursery crops, it includes fundamental soil nutrient management information that is beneficial to turfgrass and landscape managers alike.

So the next time you're surfing the net, unearth practical soil and nutrient management information located in *Something to Grow On*. The information you find may help you be a more effective turfgrass manager.

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Cornell University Turfgrass Team

The main page of the Something to Grow On *web site (above) lists a comprehensive array of topics covered by the site. A section on fertilization (below) includes a discussion of advantages and disadvantages of fall fertilization. The site can be accessed at http://www.cals.cornell.edu/dept/flori/growon/field.html.*

Something to Grow On *presents useful information for the commercial green industry as well as individuals interested in learning more about nutrients, soil properties and how they affect plant growth.*

Surf over to http://www.cals.cornell.edu/dept/flori/growon/field.html.

Something To Grow On

Turfing The Net

A new web site from Cornell's Department of Floriculture & Ornamental Horticulture provides information on a wide variety of technical and general soil topics.

The World Wide Web is an ever-expand ing information resource and an efficient means to transfer knowledge. Internet web sites from reliable sources can provide practical information for effective management of turfgrass systems. *Something to Grow On*, a web site from the Department of Floriculture & Ornamental Horticulture at Cornell University, provides useful information for the commercial green industry as well as individuals interested in learning more about nutrients, soil properties and how they affect plant growth. The site's address is http://www.cals.cornell.edu/dept/flori/growon/field.html.

Help with Practical Problems and Answers to Questions

Visitors to the site will discover a wealth of practical information and guidelines and instructions to help them diagnose worrisome problems and take steps to solve them. Suppose you suspect a plant nutrient deficiency in a lawn or turf field. A visit to the *Something to Grow On* site will provide instruction on how to collect a soil sample for nutrient analysis and how to make sense of the soil test results.

Information on a wide variety of topics is presented through the site to help visitors answer diverse technical and general questions. For example, if you've ever wondered how soil pH affects nutrient availability, why nutrients leach more readily from sandy soils than from clay soils, what happens when you add lime to soil, what are common sources of soluble salts, can excessive amounts of salts harm plants, and what nutrients are present in a complete fertilizer, you can find this information at the *Something to Grow On* site.

Further, you can learn how to interpret laboratory soil test results and apply this information to solve your turf problem. Find out why soil pH plays such a critical role in maintaining healthy turfgrass. Differentiate between cation exchange capacity, buffering capacity and exchange acidity, and discover what these values can tell you about your soil.

A Diversity of Topics

There's more! *Something to Grow on* contains information about many additional topics, including:

- the nitrogen cycle
- sources of nutrients
- macronutrients
- micronutrients
- fertilizer classification
- mobile and immobile elements
- foliar analysis
- liming
- soil properties
- fertilizer application rates
- salt index

Although this site and some specific nutrient management recommendations it contains

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