CORNELL UNIVERSITY TURFGRASS TIMES

CUTT

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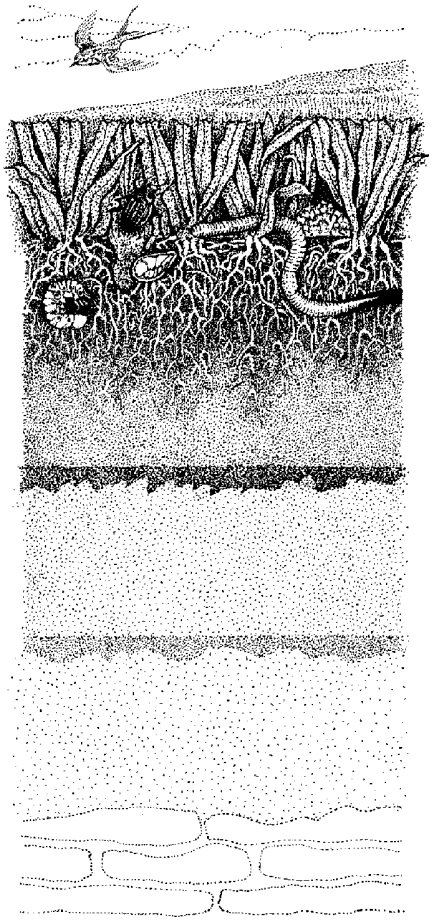

The Science and Management of Turfgrass Winter Injury

Each year acres of turfgrass across the northern regions are affected by winter injury. In some cases the injury can be severe and lead to "winterkill:" turf death resulting from singular or combined effects of freezing stress, ice encasement, traffic, desiccation, soil frost heaving, and low temperature fungi. Many of these factors, such as ice encasement or species susceptibility to freezing stress, are not easily managed.

Extensive turf loss can have significant environmental and economic consequences on the functional and aesthetic quality of recreational turf areas. Turf loss from winter injury, most evident in the spring, results in increased weed encroachment, greater soil erosion, and often requires energy intensive reestablishment procedures to restore the environmental benefits of a contiguous and healthy turf cover. ■

Low Temperature Acclimation

Survival of perennial vegetation such as turfgrasses, trees and other species that persist in northern climates requires adjustments in growth in response to day length and temperature changes. These adjustments (acclimation mechanisms) that are required for winter hardiness can begin to occur in mid to late summer. This fact is easily proved when bentgrass plants are taken from the field in June, they are easily killed at about 32 °F, while plants taken at peak hardiness in early January can survive down to -35 ° F.

Maximizing energy production from photosynthesis is essential for winter hardiness. The plant produces energy from photosynthesis and utilizes a portion for additional biomass (leaves, roots, etc.) then begins to store energy for the winter.

Energy storage is vital for winter survival for several reasons. The first and most important reason is that while the plant is dormant, it continues to respire (burn) energy. It is similar to when we sleep: we continue to breathe, we just breathe differently (deeper, more slowly). Therefore the plant must have the necessary energy to respire or it will be more susceptible to diseases and other stress.

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This Times

Short Cutts

Jennifer was selected for the Chapman Award for the scientific quality of her research, her productivity in publications and presentations and her demonstrated excellence in professional activities.

Jennifer Grant Honored

Jennifer Grant, a Ph.D. candidate in Dr. Mike Villani's lab and active Cornell Turfgrass Team member, was awarded the first Paul J. Chapman Fellowship from the Department of Entomology at the New York State Agricultural Experiment Station (NYSAES) in Geneva, NY. This award automatically comes with a nomination for the Comstock Award sponsored by the Entomological Society of America (ESA) for an outstanding graduate student.

Jennifer was selected for the Chapman Award for the scientific quality of her research, her productivity in publications and presentations and her demonstrated excellence in professional activities. Her advisor, Dr. Mike Villani,

commented on Jennifer's award saying, "I believe her research project embodies the spirit that led to the creation of the agricultural experiment station system: the use of rigorous and creative science to solve real world problems to improve the lives of all citizens of the state."

Many turfgrass managers remember Jennifer as the Turfgrass IPM Specialist in NY State from 1990 to 1996. She emerged as a leading authority on Turf IPM principles and practices, speaking on programs across the country and in Canada. In 1996, Jennifer left the New York State IPM Program to pursue a Ph.D. with Dr. Villani to study the behavior of entomopathogenic nematodes under a variety of environmental conditions. In addition, she is investigating the biotic insect mortality factors in turfgrass and their relation to scarab grub populations.

Jennifer, a Vermont native, has worked in Honduras teaching gardening to youth and has travelled the world. She has an energetic and engaging approach to her life and work that includes a voracious appetite for sports, particularly cycling, skiing and volleyball. Her willingness to provide leadership in Turfgrass Team activities is a measure of her commitment to "bridging the gap" between research and implementation. Congratulations Jennifer!

Turfgrass Management Short Course Returns to Long Island

For the third year of our commitment to the Green Industry on Long Island, we will be offering the Cornell Turfgrass Short Course on Long Island from February 15-26, 1999. This is the traditional two week course for industry professionals that addresses the broader areas of turf management, with breakout sessions on golf, sports and landscape management. Valuable hands-on laboratory sessions will be offered for students to identify grasses, weeds and insects, understand soil physical properties, and learn equipment calibration.

This course has educated over 1,300 turfgrass professionals from around the world and is regarded nationally as one of the best educational experiences available in the turfgrass industry. For more information on the L.I. Turfgrass Short Course, contact the Director of Educational Programs for the Cornell Turfgrass Team, Joann Gruttadaurio at (607) 255-1792. A course registration form is on page 10.

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From Toxic to Friendly Fairways on Long Island

A Suffolk County Health Department study conducted in cooperation with the New York State Department of Environmental Conservation and as a condition of the New York State Pesticide Registry indicates that golf courses, long thought of as major groundwater polluters, are in fact more groundwater friendly than homeowners and farms. Much of the skewed reporting of this issue dates back to a report from the New York State Attorney General's Office titled *Toxic Fairways.*

In the Health Dept. survey, 20 wells located on or downgradient from 10 different golf courses were sampled for pesticides. This study included 12 new shallow monitoring wells in areas considered to be "worst case scenarios" immediately adjacent to treated areas on the golf courses. The results show that 17 of the 20 wells monitored had no detectable level of pesticides or metabolites. Two wells at West Sayville and one well in Sands Point did have detections that exceeded the maximum concentration levels (MCL) for certain pesticides.

Interestingly, the levels of nitrate in the groundwater samples were slightly below that of residential land and much lower than the average concentrations on agricultural land. Furthermore, an editorial in the September 3, 1998 News-Review on Long Island promotes the use of open space for golf courses as a result of the groundwater survey.

Excerpted from a news article citing the Suffolk County Health Department study.

Erosion Control Best with Sod

Establishing highly disturbed areas following construction activity poses substantial risk to surface water quality. The movement of sediment may include substantial nutrient loading of water bodies as well as sedimentation from the particulate additions. Effective means of stabilizing these sensitive areas are available from natural and man-made materials.

Researchers at the University of Maryland (including Cornell alumnus Dr. Mark Carroll, Ph.D. '88), investigated the effectiveness of two natural (dry oat straw and turfgrass sod) and four man-made erosion control materials (wood excelsior fiber mats, woven mesh jute fabric, polyester netted coconut fiber, and coconut fiber woven strand). Soil was disturbed on an 8% slope to simulate construction activity. A rainfall simulator was used to establish a condition likely to result in erosion on the plots that were covered with one of the erosion control materials. Rainfall was applied for 30 minutes to establish an antecedent soil moisture, then a 3.8 inch rain was applied for 30 minutes. This storm is likely to occur 1 out of every 5 years.

The sodded plots were the only treatments that extended the time needed to initiate runoff from the site. The other materials had similar runoff initiation times to bare soil. Sod decreased to total amount of runoff by 61% as compared to bare soil. Straw reduced the runoff 25% and jute 16%. All the man-made erosion control materials reduced runoff equally, between 18 and 25%.

There was no significant difference among erosion control materials for sediment loss, except that the open woven coconut strand mat was 9 to 50 times less effective than sod. This was likely due to the mat being first to wet and then pull away from the soil surface, allowing for surface flow under the mat. In addition, with regard to infiltration, the sod was able to maintain a high rate of infiltration longer than the other materials before slowly declining.

The researchers concluded that on moderately sloping hillsides, natural erosion control materials such as sod and straw are equally effective or superior to man-made materials. Of the man-made materials the jute was most effective in reducing the volume of runoff and reduced sedimentation.

From: Krenitsky, E.C., M.J. Carroll, R.L. Hill, and J.M. Krouse. 1998. Runoff and sediment losses from natural and man-made erosion control materials. Crop Science 38:1042-1046.

Scanning the Journals

A review of current journal articles

A Suffolk County Health Department study indicates that golf courses, long thought of as major groundwater polluters, are in fact more groundwater friendly than homeowners and farms.

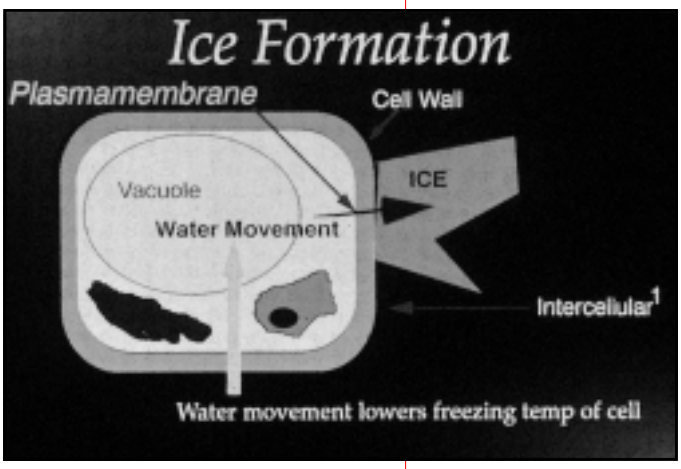
The researchers concluded that on moderately sloping hillsides, natural erosion control materials such as sod and straw are equally effective or superior to man-made materials.

Winter Injury

continued from front cover

Researchers have quantified the reduced hardiness of annual bluegrass following 8 hours of temperatures above 40 ° F. It was concluded that freezing tolerance was reduced 5–10 °F following that slight warming.

Figure 1



The next important aspect of acclimation has to do with cell membranes. The membrane structure is altered in a similar fashion as it does when a plant enters dormancy from moisture stress. In fact, studies have shown with some plants that slight moisture stress during acclimation can enhance winter hardiness. Also, there appears to be a requirement for certain turfgrasses to experience primary acclimation following freezing temperatures around 32 ° F, then secondary hardening when temperatures fall into the 15 °–25 ° F range.

Ice Formation Within the Plant

Plants that are most successful in surviving winter are able to tolerate ice formation between the cells. On extremely rare occasions, ice will form within a cell, if temperatures drop rapidly, however for grasses this is thought to be a minor issue. Rather, it is the formation of ice between cells that draws water from within a cell and results in desiccation (see Figure 1).

The phenomenon of crown hydration is a result of excessive cell dehydration. For example, during the most sensitive period from late winter through early spring when most winter injury occurs, freezing and thawing temperature fluctuations prevail. If the turf is saturated, in standing water, or a blackening agent is applied and allowed to accumulate and absorb heat, that heat is transferred to the plant and growth is stimulated. When growth is stimulated, the tissue fills with the water that drives growth (cell expansion). That water is now available for freezing when the temperature drops. As the ice begins to form between the cells, the crystals "draw" water from inside the cell and cause cell death.

Researchers have speculated for years that one of the single most important aspects for enhancing winter hardiness is delayed de-acclimation or breaking of dormancy. This is most difficult with annual bluegrass that is likely to break dormancy rapidly in the spring. In fact, researchers at the Prairie Turfgrass Research Center have quantified the reduced hardiness of annual bluegrass following 8 hours of temperatures above 40 ° F. It was concluded that freezing tolerance was reduced 5–10 ° F following that slight warming.

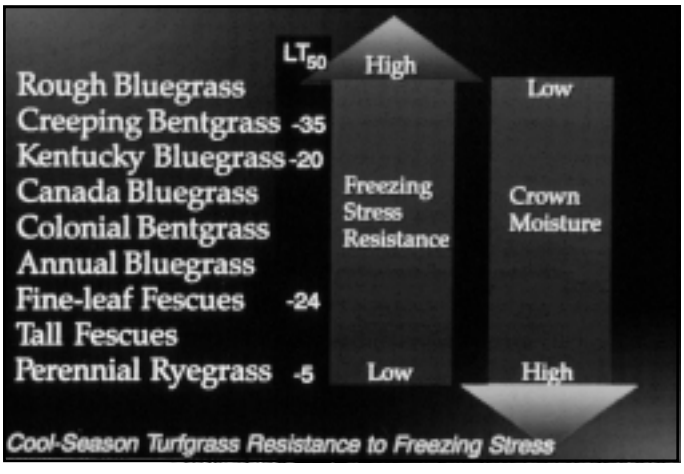
It is important to understand a few of these basic principles, because they assist with determining the most effective management program for ensuring survival. Still, winter hardiness is extremely dependent on the species of turf growing (see Figure 2). Creeping bentgrass is one of the most winter hardy species, while annual bluegrass is one of the more susceptible. Perennial ryegrass and tall fescue can be marginally hardy in the northern climates in the first few years following establishment. Mature stands can be more winter hardy, especially if the soils are well drained and the area is somewhat protected.

Ice Encasement

As indicated previously, turfgrasses continue to respire energy throughout the winter. This physiological process requires gas exchange. Therefore, when winter conditions result in ice formation on the turf surface, the necessary gas exchange cannot occur and the area beneath the ice becomes anaerobic (lacks oxygen). In addition, there are substantial amounts of gas given off from the soil as some microbes remain active, such as the snow mold organisms.

The cool-season grasses have varying abilities to tolerate ice encasement. For example, under research conditions, annual bluegrass can survive up to 60 days under ice, Kentucky bluegrass 100 days and creeping bentgrass 150 days. This is probably consistent with most turf manager's experience with the regular loss of annual bluegrass under winter conditions.

Figure 2



Severe incidents of ice encasement are sporadic, occurring one out of every three to five years in most northern regions, and management can be difficult. Yet, the key to alleviating the problem is simply to break the ice to allow adequate gas exchange (see Figure 3). This can be accomplished by physically disrupting the ice. Several turfgrass managers have utilized core cultivation equipment fitted with solid, "hammer-like" tines to break the ice. Still, the use of a "blackening agent" such as dark compost or natural organic fertilizers, such as Milorganite, applied to the ice surface on bright days absorbs heat and creates pores in the ice that allow for gas exchange.

Unfortunately, ice encasement is not the only challenge from this phenomenon. During the transitional period between late winter and early spring when freezing and thawing can occur, the plants experience warm, saturated conditions. These conditions, described earlier in this article, can lead to freezing stress, where ice forms within the plant, causing severe cell dehydration. Again, this argues for adequate surface drainage as a means of minimizing this problem.

Factors that Influence Hardiness

Drainage. One of the most critical aspects of winter injury whether it is ice encasement, snow molds or crown hydration (cell dehydration) is free water for freezing or to encourage disease. In addition, wet fall periods prior to winter will reduce winter hardiness. The importance of proper surface drainage cannot be stressed enough, especially on turf areas such as athletic fields and golf greens that are trafficked in the early spring.

Fertility. For the grass plant to maximize photosynthetic activity, adequate, well balanced nutrition must be available. In fact, many studies have shown increased energy (carbohydrate) storage following late-fall fertilization. Products that have a high percentage of water soluble nitrogen are ideal for this purpose, however, on sandy soils, care should be taken to use more moisture dependent slow release materials such as IBDU to ensure water quality.

The late fall fertility is best applied after top growth has ceased which typically coincides with seven to ten days when the mean daily average temperature is 50° F. This will ensure that any warming periods that might stimulate top growth (Indian summer) and reduce hardiness have passed. There is usually a period from late September through late October, depending where you are in the north, when fertilizer should not be applied.

Many turf managers apply excessive amounts of potassium (K) in the late season to enhance winter hardiness. Keep in mind, there is no conclusive evidence that indicates K levels above that which is required for adequate growth (indicated by soil test) will enhance winter hardiness. Furthermore, there may be severe consequences from excessive application of high salt content fertilizer as suggested by researchers investigating bentgrass decline in the southeastern United States.

Mowing Height. If we accept that grass leaves are where the energy is produced that enhances hardiness, it follows then to have as much leaf surface area available in the late season as possible. Excessive close mowing, at or below the acceptable range for a particular species, will compromise energy production and reduce winter hardiness. It is advisable to raise the mowing height on putting greens if golfers will tolerate reduced ball roll distances.

There is no research data that indicates that a final "close" mowing will reduce snow mold incidence. Still, close mowing may benefit when the turf is excessively tall and folds over onto itself, matting up in a fashion similar to tree leaves left on the turf.

Thatch. Excessive thatch accumulation will reduce winter survival as a result of plant crowns and other perennial structures being elevated from the soil/thatch interface and less buffered

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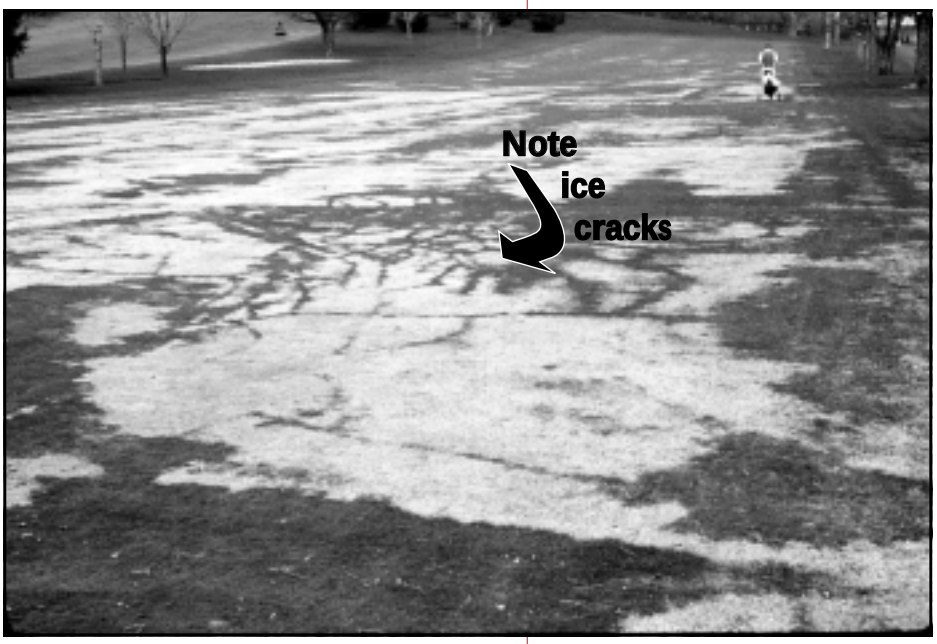
Figure 3



Why Bother Learning About Turf Microbiology?

IPM Integrated Pest Management

IPM Corner

High microbial activity in the soil leads to increased root growth over time, due to effects on soil quality and improved nutrient availability.

Decomposers are present in enormous quantities in soil, estimated in tons per acre. Not only do they release substances taken up by roots, but they also secrete complex carbohydrates that have beneficial effects on the physical aggregation of the soil.

The life of a turfgrass manager is much easier when the soil contains a balanced array of microscopic organisms, because they increase plant health. The benefits of fostering this natural ecosystem include adaptability and resiliency of the turf. High microbial activity in the soil leads to increased root growth over time, due to effects on soil quality and improved nutrient availability. There are beneficial bacteria and fungi in soils, sludge and composts, and new biological control formulations to prevent turfgrass diseases. With an improved root system, the turf will show less damage from the stress of low mowing height, seasonal changes, dry, hot weather, heavy rainfall, insects, or diseases.

Nutrient cycling depends on the activity of microorganisms. Many species of bacteria and fungi are decomposers, organisms that feed on grass clippings, thatch, and other dead plant and animal materials. These microbes release soluble substances into the soil that are excellent nutrient sources and stimulators of plant growth. Most decomposers need temperatures above freezing, some moisture, and a good supply of oxygen. They also need nitrogen, and will compete successfully with plant roots for nitrogen if necessary. There must be sufficient nitrogen to keep decomposition going and prevent the plants from yellowing.

Other groups of bacteria in the soil live on simple elements in the air and soil, converting these elements into molecules that plants can absorb and use. One example is the nitrogen fixing bacteria that use gaseous nitrogen from the atmosphere, releasing complex nitrogen compounds to the soil.

Occasionally the benefit of bacterial activity is not appreciated until it is gone. For example, when a fungicide drench was applied to Easter lilies in a central New York greenhouse to suppress root disease, it killed the beneficial bacteria, and very severe root damage was observed. The bacteria were critical in converting urea in constant-feed fertilizer into a form of nitrogen that roots can take up. Without the bacteria, the soluble salts accumulated to toxic levels, and the roots died. Chemicals applied to outdoor soil can also result in major shifts in the microbial activities observed, with drastic results at times.

Soil quality is very closely linked to the biological properties of soil. Many physical and chemical properties of soil are influenced by microbiological processes. Some of the properties affected by the size and composition of the microbial biomass are water holding capacity, aggregate stability, and susceptibility to compaction.

Decomposers are present in enormous quantities in soil, estimated in tons per acre. Not only do they release substances taken up by roots, but they also secrete complex carbohydrates that have beneficial effects on the physical aggregation of the soil. When they die, their mass increases the organic matter content of the soil and becomes part of the mysterious material called humus. This material is highly valued as a soil constituent because it has a very high exchange capacity for charged mineral ions and it also retains water.

Biological control of turfgrass diseases relies on addition of specific beneficial organisms and topdressing with compost. Inoculation with microbes and supplying rich organic matter to boost microbial activity increase the diversity and activity of soil organisms in the soil. Disease suppression and deeper rooting are the long term goals.

Nearly all turfgrass diseases are caused by common pathogens, fungi that can infect, colonize and reproduce on many types of plants. There are natural microbial enemies of the disease-causing fungi. They may compete with pathogens for food, secrete antibiotics that antagonize the pathogen, or use the pathogen as a food source. A standard farming practice for controlling diseases is to till infected plant residues into the soil, where decomposers will degrade the plant material and fungi together. In turf, topdressing with good compost can achieve the same purpose, supplying organic matter to native microbes, and increasing the moisture and nitrogen levels in the top inch or two of the soil. Active microbes will reduce the inoculum potential for disease, as well as digesting the thatch.

Many beneficial bacteria and fungi have been isolated that can successfully compete with pathogens in laboratories. It is more difficult to predict what formulated products containing these live organisms will do in the field than in the lab, where conditions can be controlled. Positive reports have come in from golf course superintendents who are injecting live suspensions of bacteria into turf. They are noticing both increased rooting depth and reduced incidence of disease. The turfgrass ecosystem will benefit from increased diversity and greater microbial activity, whether it is from applying organic fertilizer, a topdressing of processed municipal sludge, or a generous application of live benefi

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The Management Bookshelf

Have you ever visited the Management section of a large bookstore or surfed a bookstore on the web for management books? If you have, you may have been lost. Books, books, books. Maybe they all look interesting or maybe none of them. In any event, there are too many to choose from; there are thirty new management books published every month.

Below I review three of my favorite books to learn about modern, people oriented management. These books can assist you in increasing the productivity of your personnel and the job satisfaction of everyone, including yourself.

Everyone's A Coach

This book by Ken Blanchard, coauthor of The One Minute Manager, and Don Shula, longtime coach of the Miami Dolphins, is an easy-to-read management book. Many managers report they have found the ideas practical and useful. One manager I know finished the book before setting it down. The authors use the letters of COACH to share their ideas on key management concepts:

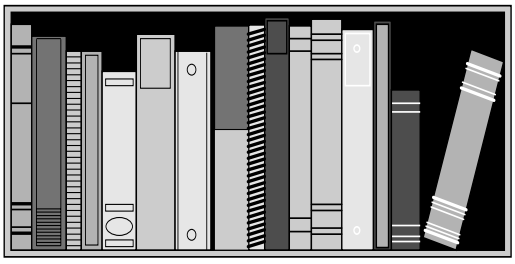
Conviction-driven
Overlearning
Audible ready
Consistent
Honest-based

Everyone's A Coach is available for purchase or ordering in your local bookstore. This book should assist you in developing and utilizing *all* the capabilities of *all* personnel in your business.

NUTS!

When we think about the culture of an organization, we usually think of big companies such as Wal-Mart, IBM, and Microsoft. It is crucial to realize that every business and organization has a culture.

One of my favorites books, NUTS! Southwest Airlines Crazy Recipe for Business and Personal Successes, by Kevin Freiberg and Jackie Freiberg can help managers of any business, including landscape businesses, golf courses and athletic departments, learn to manage their organization, culture and their people.



Southwest Airlines has been profitable in each of the last twenty-five years in an industry than has been very competitive with frequent mergers and bankruptcies. They have accomplished this feat by committing their employees to act like owners and by developing the talents of these employees.

Some of the chapter titles follow:

- *Flying in the Face of Conformity*
- *"Professionals" need not apply*
- *Kill the Bureaucracy*
- *One Great Big Family*
- *Luv*
- *Unconventional Advertising*
- *Customers Come Second*
- *Employees Come First*

Each chapter ends with the management lessons the authors called "Successes in a Nutshell." You will enjoy this wonderful book.

Managing to Have FUN

The third book was given to me by my young adult son: Managing to Have FUN, authored by Matt Weinstein. Especially in light of the challenging time faced by many turf businesses, the following quote from the book seems appropriate:

> "Serious times do not necessarily call for solemn behavior. Solemnity as a way of life is greatly overvalued in our business culture. *Life does not become less serious when it is spiced with fun and play.* Rather, it becomes richer and more vital. It becomes less stagnant and more open to change and growth. It becomes more fully alive."

Mr. Weinstein's four principles of what adds fun as a part of a successful and productive business are:

- Think about the specific people involved.
- Lead by example.
- If you're not getting personal satisfaction from what you're doing, it's not worth doing.
- Change takes time.

The book then presents fifty-two examples of how businesses have added fun to their business to add job satisfaction and fulfillment of the mission of the business. If you look at the book, I encourage you to read at least the first two and the last chapters.

Above all, *have fun!*

Robert A. Milligan
Cornell University Turfgrass Team

Human Resource Update

Managers of any business, including landscape businesses, golf courses and athletic departments, can learn to manage their organization, culture, and their people successfully by committing their employees to act like owners and by developing the talents of these employees.

Winter Injury

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It may not be wise to topdress with highly angular sand and brush it in. This practice may abrade the leaf surface and accelerate desiccation.

While there is limited data on early season play, estimates suggest that active play during the "shoulders" of the growing season can require many weeks of active growth for recovery.

When winterkill is widespread, it tends to get people's attention. Be prepared to seize the moment and talk to the users.

from extreme temperatures. In addition, thatch levels above one inch can promote desiccation and turfgrass disease incidence. Late season core cultivation that incorporates the soil from the cores into the thatch layer can assist with solving this problem and actually improve drainage by breaking through layers.

Disease Management. Two research projects from Japan suggested that low temperature pathogens could "sense" weak plants that might be more susceptible to infection. Subsequently, as indicated several times to this point, maximizing plant health through proper acclimation with water management, fertility and mowing height, could result in reduced snow mold. Nevertheless, species such as perennial ryegrass, creeping bentgrass, and annual bluegrass are highly susceptible and will require preventative management to ensure survival. Dr. Eric Nelson provides insight into this subject in this issue of *CUTT* (see back cover).

Topdressing. Many turfgrass managers have practiced heavy, late season topdressing that serves to insulate the turf and protect the crown from desiccation in open winters. However, golf turf managers in the north central United States have experienced problems from late season sand topdressing that might be dragged or brushed in. Dr. Don Taylor at the University of Wisconsin-River Falls has begun a study investigating this management practice. Results from the first year were inconclusive. Still, it may not be wise to topdress with highly angular sand and brush it in. This practice may abrade the leaf surface and accelerate desiccation.

Traffic. Of all the management factors that are under the control of the turfgrass professional, minimizing traffic during periods when the soil is frozen or just when turf is not actively growing can be the most difficult. Players want to use the turf and that conflicts with what is known regarding maintaining healthy plants. While there is limited data on early season play, estimates suggest that active play during the "shoulders" of the growing season can require many weeks of active growth for recovery. Therefore, if possible, minimize traffic when the plants are dormant or the soil is frozen.

Turf Covers. The use of synthetic protective turfgrass covers, for enhancing winter survival, has provided variable results over the years. Recent studies from Laval University in Quebec have indicated that snow is the best insulator and should be kept on as long as possible. The next best thing is any cover that uses an air layer to insulate the turf from extreme temperature and moisture. Keep in mind that covers accelerate green up in the spring and can result in reduced winter hardiness if temperatures drop suddenly.

Let's Talk!

With the variety of technology available to the turfgrass manager, winter injury reminds us how "biology rules" and we remain governed by the laws of nature. However, many strategies are available to enhance hardiness through adequate drainage, proper nutrition (especially timing), and minimizing traffic during dormancy or on frozen soil. Still, the grass may suffer winterkill.

It is essential for the turfgrass manager to develop and utilize this opportunity to communicate, when users are paying attention to the potential for dead turf. This is a chance to discuss aspects of the management program that is adjusted to meet the unrealistic expectations of late season play, that neglected drainage project or possibly an extra fertilizer application to enhance hardiness. It is human nature to avoid some issues until a crisis. When winterkill is widespread, it tends to get people's attention. Be prepared to seize the moment and talk to the users.

FRANK ROSSI
CORNELL UNIVERSITY TURFGRASS TEAM

Short Cutts

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Golf Turf Field Day Takes Industry By Storm!

The inaugural Cornell Golf Turf Research Field Day was held on Tuesday, August 18, in a driving cold rain storm. Over 200 golf turf professionals braved the weather to learn more about the internationally recognized turfgrass research program at Cornell. Highlights of the day included a walking tour of the research projects underway on the Robert Trent Jones Golf Course at Cornell University: managing tees in the shade, evaluation of bio-control products, and annual bluegrass exclusion programs. In addition, lively discussions were held on the new generation of insecticides (Merit, MACH II), evaluating effectiveness of Bio-ject organism applications, and establishing and trafficking the new bentgrasses.

Plans are already underway for Field Day 1999 scheduled for Tuesday, August 17, 1999 at the Cornell Turfgrass Research and Education Center. If you'd like more information about the Field Day or any other Turfgrass Team activity, contact our Team Assistant, Kelly Woodhouse at (607) 255-3090.

Cornell Golf Turf Short Course for 1999

Innovative Pest Management Highlights

As announced in previous issues of *CUTT*, the two week Turfgrass Management Short Course has been altered to address more advanced topics in specific sectors of the turfgrass industry. The Cornell Golf Turf Short Course will be held from January 11–15 at Cornell University, utilizing the Executive Training Center at the Statler Hotel on the campus. This venue will allow for a meaningful learning experience in a professional setting.

The focal area for 1999 is Innovative Pest Management. Speakers from the Cornell Turfgrass Team as well as nationally renowned presenters such as Joe Vargas of Michigan State University, Bruce Clarke of Rutgers University, Pat Vittum from University of Massachusetts, and Fred Baxendale from Nebraska. Throughout the 4 1/2 days of the course, participants will learn vital research-based information that will enable them to design state-of-the-art disease, insect, weed, and nematode management programs. Lively question and answer sessions are scattered throughout the week to address specific pest management issues at your facility.

Our Cornell Turfgrass Team Director of Education, Joann Gruttadaurio has secured 3.2 Continuing Education Credits (formerly tested CEU's) for GCSAA certified superintendents, as well as Pesticide Recertification credits. A variety of educational materials will be available and utilized during the course and are sure to become standard reference materials in your pest management "toolbox". Space is limited to ensure maximum interaction with the presenters. A course registration form is on page 10; for more information Joann can be reached at (607) 255-1792.

Participants in the inaugural Cornell Golf Turf Field Day (above) brave stormy weather to learn more about Cornell's internationally recognized turfgrass research program. Former turfgrass Extension Associate and CUTT Editor Norm Hummel and Frank Rossi at the Field Day (below).

Cornell Sports Turf Short Course for 1999

Plan, Design, Construct, and Manage Safe Athletic Fields

The increased need for advanced training in the art and science of sports turf management motivated the development of the Cornell Sports Turf Short Course scheduled for January 4-8, 1999 on the campus of Cornell University. Specifically, this advanced short course will draw on the wealth of expertise on the Cornell Turfgrass Team, as well as seasoned professionals in the Sports Turf industry.

The Sports Turf Short Course will address the planning, design, construction, and establishment of athletic fields to lay a good foundation for active, multiuse and single use fields. In addition, several days will be spent developing a sorts turf management program focused on maximizing fields safety through proper mowing, fertilization, watering, cultivation, and overseeding practices. Special sessions will be presented on developing communication skills with coaches and administrators, as well as the keys to setting up an effective sports turf IPM program.

Space is limited to encourage interaction with speakers and to provide for a comfortable learning environment. If you'd like to know more about this exciting program contact Joann Gruttadaurio, Turfgrass Team Director of Education at (607) 255-1792. A course registration form is on page 10.

C U T T

Cornell Turfgrass Short Courses Registration Forms

Register early to reserve your place!

If you choose to pay by installment plan, you may pay for the course by check or credit card. If you are paying by check, you will be invoiced for the remaining payments as they become due. If you are paying by credit card, the card number provided will be automatically charged. Payment deadlines follow:

Sports Turf Short Course: January 4-8, 1999

☐ Full payment of $600 enclosed

☐ Yes! I want to pay using the Installment Plan
$200 due with this Registration Form
$200 due November 16, 1998
$200 due December 15, 1998

Name:

Address:

City: State: Zip:

Phone: Email:

Method of payment:

☐ Check (payable Cornell University) _____ amount enclosed

☐ Purchase Order/Requisition
PO#: _____

☐ Credit Card: ☐ VISA ☐ MasterCard

card number:

exp. date: today's date:

signature:

Return this form to: Cornell University Sports Turf Short Course, P.O. Box 6634, Ithaca, NY 14851

Golf Turf Short Course: January 11-15, 1999

☐ Full payment of $750 enclosed

☐ Yes! I want to pay using the Installment Plan
$250 due with this Registration Form
$250 due November 16, 1998
$250 due December 15, 1998

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Long Island Turf Short Course: February 15-19, 1999

☐ Full payment of $995 enclosed

☐ Yes! I want to pay using the Installment Plan
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$300 due January 5, 1999
$300 due February 5, 1999

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Method of payment:

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Snow Mold Diseases

continued from back cover

Preventive fungicide applications are quite helpful in minimizing snow mold damage. However, oftentimes the fungicides effective against Typhula blight are not always effective against pink snow mold. Among the better choices for fungicide applications are iprodione (e.g., Chipco 26019 2F) applied at 4-8 oz./1000 ft^2, azoxystrobin (Heritage 50WG) applied at 0.4 oz./1000 ft^2, or PCNB (e.g., Terrachlor 75W) applied at 8 oz./1000 ft^2. These fungicides are usually applied in mid to late October up until mid November prior to turf dormancy and snow cover.

In the spring, be sure to rake out any diseased areas to facilitate drying and fertilize to promote turfgrass growth. Snow molds are generally not devastating. But, if left untreated, could destroy vast areas of turf. So take some time now to prepare your turf for next spring!

ERIC NELSON
CORNELL UNIVERSITY TURFGRASS TEAM

Turf Microbiology

continued from page 6

cial microbes to the root zone. Chemical pesticides should be used as sparingly as possible. The goal: a balanced and active microbial population, and heathy green grass.

In future reports on this subject we will examine other questions: For example, how do cultural practices (mowing height, leaving clippings on the turf, watering, fertilizing, cultivating or removing cores of the turf, de-thatching, topdressing, applying fungicides, applying insecticides, liming) affect turfgrass microbiology?

What can we do to improve microbial activity and soil health? While cultivation plus topdressing relieves soil compaction, manages thatch, improves drainage by breaking through soil layers, and aerifies the soil; what is the effect of short term inoculation for biological control? Is there a gradual increase in rooting depth by adding compost?

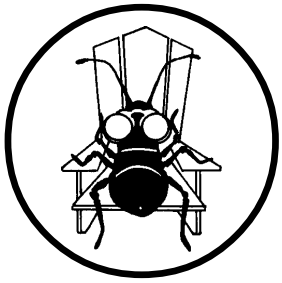
What are the roles of organic matter and humus in turfgrass microbiology? Adding organic matter increases activity until nitrogen is limiting. What about the release of complex and simple nutrients that can be absorbed by roots, or changes in the population profile. Humus — organic matter at the endpoint, no longer degradable by bacteria — results from the cycling of bacterial products. What are the special roles of actinomycetes, saprophytic fungi and nematodes?

JANA LAMBOY
NEW YORK STATE IPM PROGRAM
CORNELL UNIVERSITY TURFGRASS TEAM

Turfgrass soils should be well drained and free of significant levels of compaction. Thatch accumulation should also be kept to a minimum to avoid high levels of water retention.

In future reports on this subject we will examine other questions: For example, how do cultural practices (mowing height, leaving clippings on the turf, watering, fertilizing, cultivating or removing cores of the turf, de-thatching, topdressing, applying fungicides, applying insecticides, liming) affect turfgrass microbiology?

Managing Snow Mold Diseases: Typhula Blight and Microdochium Patch



Pest Watch

Fertilization should occur in the late summer, early fall or should be applied as applications after top growth ceases, well after any Indian summer.

For decades, the Northeast has been plagued with severe snow mold diseases. This has been due in large part to heavy and persistent snow cover characteristic of this region. More recently, however, the relatively wet and mild winters coupled with cooler and wetter springtime conditions have promoted more severe outbreaks of Microdochium Patch. Now is the time to begin considering strategies for minimizing snow mold damage this winter and the following spring.

In New York State, there are two major snow mold diseases causing problems on nearly all turfgrass grown in the state, whether they be on home lawns or on golf courses. These include gray snow mold or Typhula blight, caused primarily in our region by the fungus *Typhula incarnata*, and pink snow mold or Microdochium Patch, caused by the fungus *Microdochium nivale*. These diseases each affect turfgrasses quite differently, with Microdochium Patch being potentially the most damaging. The management strategies for these snow mold diseases must necessarily be multifaceted, including cultural, biological, and chemical approaches.

Fertility management is key to minimizing snow mold damage. It is important to avoid heavy fertilizer applications late in the fall to avoid stimulating unnecessary foliar growth that is more susceptible to infection. Fertilization should occur in the late summer, early fall or should be applied as applications after top growth ceases, well after any Indian summer. Often heavy dormant applications of organic fertilizers, particularly those that are compost-based, are quite helpful in minimizing snow mold damage. These materials provide significant levels of biological activity that help to suppress the activities of the snow mold pathogens. Applications of such composted materials to sensitive areas of between 10 and 200 lbs/1000 ft^2 have been effective. However, you should make sure that composts are adequately stabilized and have an “earthy” odor.

Water management is another key component of successful snow mold management. It is important that turfgrass soils be well drained and free of significant levels of compaction. It is often helpful to maintain lawn turf at a minimum cutting height so that a dense turf canopy, which often holds more moisture and maintains higher relative humidities, does not become matted down with snow cover. Thatch accumulation should also be kept to a minimum since excessive thatch levels can result in high levels of water retention. It is equally important to reduce the amount of snow cover, if at all practical, and to prevent compaction of the snow cover on disease-prone areas. Generally, the greater the snow cover, the longer the soil will stay wet in the spring. Maintaining low soil pH (<6.0) and balanced soil fertility is particularly important in reducing the severity of Microdochium Patch damage.

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Cornell Cooperative Extension

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