SPORTS TURF MANAGER
... for better, safer Sports Turf
JUNE 1998

GTI HILITES
Problems with Over-Irrigation

During the 1995 and 1996 seasons, Mr. Steve Thurtell, a graduate student studying with Dr. Claudia Wagner-Riddle in the Department of Land Resource Science conducted a study to determine the influence of water and fertilizer management on the quality of water draining from a turf grass site. In particular they were interested in the discharge of nitrate nitrogen in the water leaving the root zone.

Ministry of the Environment guidelines suggest that water leaving the root zone should not contain more than 10 ppm of nitrogen in the form of the nitrate ion. Unfortunately, all forms of nitrogen applied to the soil will eventually be converted to nitrate, which is completely soluble in water. Hence, water percolating through the root zone will carry the nitrate with it, if the nitrate is not absorbed by the turf root system. The objective of good turf management is to minimize the concentration of nitrate ions in the soil solution while at the same time maintaining optimum turf growth.

The research site at the GTI was a reconstructed site and is comparable to what might be found on a golf fairway or a football field constructed with original soil. In this case, the root zone was 30 cm of loam topsoil overlying a sand to gravel subgrade. The turf was primarily Kentucky bluegrass.

Fertilizer was applied as ammonium nitrate to provide zero nitrogen, 1.8 kg N/100 m^2 and 3.6 kg N/100 m^2 per year. Only two-thirds of the rate was applied in 1995 due to the late start of the experiment and the yearly rate was split into three equal applications.

Irrigation was applied at a rate to provide normal rainfall, normal rainfall plus 100% of the potential evapotranspiration (PET), and 150% of PET as irrigation. PET was calculated according to a modified-Penman, computerized model which calculated PET from hourly average air temperature, relative humidity, wind speed, incoming short wave radiation, and hourly total rainfall. Irrigation was applied each time 50% of the estimated available water was consumed. From the data it was possible to compute the amount of water which had been lost through drainage.

Soil solution samplers were installed in each plot to allow the removal, on a two to three day frequency, of small samples of soil water which were analyzed for nitrate-nitrogen content.

Table 1 summarizes the total amount of nitrate nitrogen leached during the study period as it relates to the amount of nitrogen applied and the amount of water which was applied as rainfall and irrigation. Where the water inputs were low and the rate of nitrogen application did not exceed the OMAFRA recommendations for average turf production, the amount of nitrate leached to the ground water was minimal. Both nitrogen at rates in excess of those recommended and irrigation beyond that required to satisfy the evaporative demand, resulted in high loss of nitrate to the ground water.

The environmental concern for nitrate leaching to the groundwater results from the fact there is no know mechanism for the breakdown of nitrate in groundwater once the water has passed below the zone of microbial conversion of nitrate to nitrogen gases. As a result, the concentration of nitrate will continue to increase in the groundwater, unless there is a high volume of water flowing to the groundwater to provide the necessary dilution to below

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GTI HILITES

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the 10 ppm safety limit. In this study, the concentration of nitrate nitrogen often exceeded 30 ppm, particularly at the double recommended nitrogen rate.

This study demonstrates once again that while nitrogen fertilization is a vital part of turf management, excessive rates are destructive to the environment, as well as to the budget. Irrigation is also a vital part of turf management; however, incorrect water management through over-application of irrigation multiplies the effect of excessive nitrogen fertilization on the environment and further destroys the budget. ♦

— Dr. R. Sheard

Table 1. *Nitrate-nitrogen leaching during the study period of July 5 to August 23, 1995 and May 12 to September 22, 1996.*

	Water Input (m)				
Nitrogen Input	0.166	0.217	0.415	0.586	0.826
	(kg nitrate-N/ha)				
0 kg N/100 m^2/yr	2.93	4.83	11.76	43.72	78.85
1.8 kg N/100 m^2/yr	5.27	9.03	17.76	40.90	65.04
3.6 kg N/100 m^2/yr	9.97	11.83	64.20	81.53	102.70

"Education must have an end in view, for it is not an end in itself."
— Sybil Marshall

News Briefs

Ontario Summer Games

From August 13-16, the Ontario Summer Games will showcase 2,550 of Ontario's rising-star athletes, ages 15-17 in 19 different sporting events. Many are expected to advance to the Canada Games in 1999 and the Olympics in 2002. The games will also involve some of Ontario's premier disabled athletes in track and field competitions. Between 10,000 and 20,000 spectators are expected at the events, producing an estimated $2-million economic impact for the City of Guelph (*Guelph Tribune*, March 1998).

Editors note: Tim Mau, Games General Manager, will be speaking at our field day in August right after the games to give us an insight as to how they are run and some of the problems encountered.

University seeks new stadium

The University of Western Ontario is the first of two universities seeking to install artificial turf (see the March issue of *Sports Turf Manager* for the article on the University of Guelph). They will work along with the Canada Games 2001 Committee to raise $15 million, $10 million of which will be for the stadium and the rest will go toward the cost of the games. The new stadium, with 12,500 seats, an eight-lane track, and artificial surface, will provide the citizens of London with a world class facility (Canadian Press).

Editors note: This will be the third university in Ontario to have artificial turf. Wilfred Laurier and Waterloo campuses combined to install this type of venue several years ago.

Chatham to host seniors games

Hundreds of seniors from southwestern Ontario will take part in the Ontario Summer Games regional competition to be held in Chatham in July 1999. Approximately 500 seniors will be present to vie for 15 sports which include carpet bowling, lawn bowling, golf, and other activities such as snooker, darts, cribbage, swimming, and bridge.

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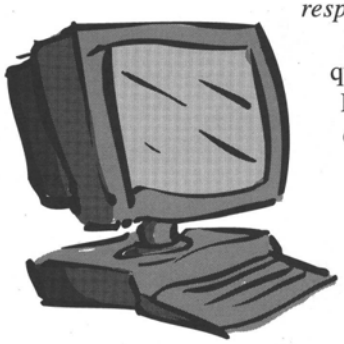
Lee Huether is in the office from 9:00 a.m. to 1:00 p.m. Monday, Wednesday and Friday. The office phone number is (519) 763-9431. At other times, a message may be left on the voice mail system. Please include the vital information of name, telephone number with area code, and time of calling. The office may be reached at any time by faxing (519) 766-1704 or via email.

Spell Checking

Anyone who types on a computer and relies on the spell checker to find his/her spelling errors is doomed to find some of those errors in print. I forever have to watch for *field* versus *filed*, *for* versus *fro*, *there* versus *their*, etc. The misspelt words are glaringly obvious after the printer has delivered the document to you for distribution.

Of course the spell checker doesn't watch for the wrong word, which is spelled correctly, but is totally out of context. An example is the word *responsible*. A slip of the fingers and it could read *response able*; the spell checker would accept both. Yet the same two words could be joined together to spell *responsibility* and again the red underline would not appear or the spell checker would not stop its search.

The spell checker would accept without question the following statement, "If one is *able*, one may provide the correct *response*, and in so doing carry out his/her *responsibilities*."



Every sports turf manager has *responsibilities* which require him/her to provide the correct *response* to a problem. It is only when he/her is *able* to do so that the *responsibility* can be fulfilled.

To be *able* depends on training, education, and workplace skills. These attributes are only gained through an ongoing process, enhanced by attending as many educational and training programs as possible. The summer field days provided by the Sports Turf Association are an example. If you are *able* to attend then you may have a better response to your *responsibilities* as a sports turf manager.

— Dr. R. Sheard

ATTENTION ADVERTISERS

If you are looking for a specific market for your products, advertise in *Sports Turf Manager*. Published four times a year, this newsletter has a national and international distribution with the majority of the membership residing in Ontario. 1998 advertising rates are as follows:

- business card size $40.00
- 1/4 page ad $80.00
- 1/2 page ad $160.00
- 1/4 and 1/2 page ads are available in either a vertical or horizontal page placement.

For more information, contact Lee Huether at the STA office, (519) 763-9431, or Joy Black at New Paradigm Communications, (519) 371-6818.

Content deadline for the September issue of Sports Turf Manager
July 10, 1998

Meet New Board Member Gord Dol

Gord Dol is the founder of Dol Turf Restoration Ltd., a company that specializes in nearly all aspects of sports field and golf course restoration, drainage, and irrigation. The company employs 15 people in season and performs various tasks on approximately 200 sites per year. 1998 marks the company's five year anniversary. Gord is also an active member of the Sports Turf Association, Ontario Parks Association, Canadian Irrigation Association, Ontario Golf Course Superintendents Association, and the Ontario Recreation Facilities Association.

PLEASE NOTE

The articles written within do not necessarily reflect the views of the Sports Turf Association.

Congratulations

✔ To student member Jamie Smith who recently graduated from the Niagara Parks Commission School of Horticultural. Jamie plans a career in sports turf management.

✔ To Mr Perry Davie, City of London, the recipient of the Sports Turf Association Scholarship for the February 1998 Turf Managers' Short Course. Perry is currently responsible for managing sports turf. He will be presented with the award at the August Field Day.

CHRISTOPHER MARK

The President's Desk

Hello! Spring and early summer greetings to all our members. With the unbelievably early spring this year, I am sure it has been a real boom for some and a challenge for others. If your fields had significant winter damage, the warm temperatures provided a great blessing by allowing turf managers an opportunity to get out on the fields earlier than normal and perform topdressing and aeration programs. However, the unseasonably warm weather has also accelerated turf growth, weed growth, and grub activity in some areas; hence, from a maintenance and personnel scheduling perspective, it has been a hectic season already for many turf managers. In addition with the warmer temperatures, sports groups, varsity teams, and intramural house leagues all want to get on the fields earlier than usual, which also complicates maintenance programs. "Go, Go, Go!" seems to have been the phrase for this spring.

Things have been go, go, go, around the STA office since the OTS and annual meeting. Our Executive Manager, Lee Huether, has been very busy undertaking usual office duties as well as attending and representing your Association at Landscape Ontario, Ontario Parks Association, and corresponding with members and potential members. Several new members joined our Association based on Lee's representation at these seminars, and she is doing an excellent job at communicating our better, safer sports turf theme. Lee has settled extremely well into her Executive Manager's duties, and we are very fortunate to have her with us.

Some initiatives that are keeping members of the Executive busy include planning for the upcoming Field Day on August 18, 1998, at the Guelph Turfgrass Institute. It plans to be an informative, educational, practical, and relaxing day with seminars at the GTI as well as a tour of a renovated baseball facility in Guelph. Please plan to join us for this superb event. Review the enclosed Field Day brochure and pass the information on to another turf colleague. Tell a friend—it will be a great day! Other items that are in the works include an updated membership brochure, as well as reprinting the highly successful "Constructing the Sportsfield" brochure. Both of these publications will include our new logo.

By this time many of you will have received your invoice for membership renewal. I understand they are coming back to the office at a steady pace. To all of you who have once again renewed your commitment to our mission of better, safer sports turf, thank you very much. For the undecided few, please consider the value of being an STA member. You will continue to receive the best newsletter in the industry (*Sports Turf Manager*), reduced rates for field days and the Ontario Turfgrass Symposium, and continue to be included in a select group of people who dedicate themselves to improving the safety of athletic fields through maintenance and construction.

In closing, I would like to note some very special anniversaries which are happening in 1998. G.C. Duke Equipment Ltd. is celebrating 50 years of service to their customers and the industry. The STA extends sincere congratulations to Richard and Nolan Duke, Dick Raycroft, and all the staff at G.C. Duke on their 50th Anniversary and wish them many more years of success. Duke Equipment has been one of the biggest supporters of the STA, as well as many other industry associations, and we truly appreciate all the assistance they have given and continue to provide on a regular basis. The other anniversary to be celebrated this year is *Turf and Recreation's* 10th Anniversary. Congratulations on 10 years of excellence to Mike Jiggens, Bart Crandall, and all the staff at *Turf and Recreation* who publish one of the most informative and professional magazines in the turf and recreation industry.

I wish all members and athletic field managers much success this summer, and I look forward to seeing you at the Field Day on August 18, 1998, at the Guelph Turfgrass Institute.

Wishing you better, safer sports turf. ♦

—Christopher Mark

ONTARIO Turfgrass SYMPOSIUM

More Conference Highlights

♦ Turf Drainage: Theory and Practice by Dr. R. Sheard and Geoff Corlett (Part 1 of 2 lectures)

♦ The Do's & Don'ts of Renovation, Seeding, and Drainage by Gord Dol

Turf Drainage: Theory

DR. R. SHEARD

Soil texture should not to be confused with soil structure. Soil texture is simply a percentage of sand, silt, and clay in any sample of soil. Clay soil particles are .002 mm in diameter, so small you need an electron microscope to see them. Silt particles are .002 m to .005 mm, and they can be seen under a light microscope. Sand particles are .005 mm to 4 mm. Particles larger than this are considered gravel. These particles can be seen by the naked eye. Very fine particles can be viewed with a hand lens.

These size groupings have been established by soil scientists. In any handful of soil, you have a continuum of particles from the very finest clay right through to dust. Soil scientists decided because there exists an infinite number of combinations of percentages of sand, silt, and clay, that they would divide them into groupings. These are sandy loam, loamy sand, loam, clay loam, and silt loam. The groupings really reflect how a certain percentage of sand, silt, or clay will react.

We now understand that anything called a sandy loam or loamy sand is going to act like sand. You can feel it with your fingers; it will be gritty—this is easy to identify. Another class is the loams. Loams are easy to till and easy to work. When a farmer talks about how he has a loamy soil, he is talking about a soil that is easy to till. On average, the loams class have an equal balance of sand, silt, and clay.

Then you have the clay types, the clay loams, the clay, and the silty clay loams. To the layman, clays are difficult to work with because they have many fine particles. By and large, if a person is working a subsoil he will say it's a clay because subsoil has no organic matter in it, no structure, it is difficult to till, to make a seed bed, or do anything in terms of growing plants. There are misconceptions as to the ability of the individual to manipulate soil.

Structure

Aggregates are the cementing together of sand, silt, and clay into larger units. These in turn are cemented together with organic matter or humus. This is a very weak cementing nature, very fragile—you can destroy soil structure. You cannot destroy soil texture unless you add sand to make a sand rootzone, for example.

Soil structure is fragile and breakable. Every time you put a machine over a golf green or a sports field; every time a player walks over it or a soccer teams' cleats press into the surface, the structure of the soil is shifted around, and it can be destroyed. Soils tend to destroy quickly when the water content is high, because the water content is the lubricant that allows the particles of sand, silt, and clay to slide over one another into closer configuration and thence into compaction.

You cannot destroy the structure of an all sand green because sand does not have any structure. It is only when you have silt and clay introduced into the system, the binding effect of organic matter, and the introduction of these larger units called aggregates, that you run into some problems. This is the decided advantage of all sand rootzones. If you have a natural soil system with organic matter, you have aggregation, you have structure, and you have a potential to destroy it—particularly under wet conditions.

Every time you put a machine over a golf green or a sports field; every time a player walks over it or a soccer teams' cleats press into the surface, the structure of the soil is shifted around, and it can be destroyed.

Porosity

Pore space is the area or void between soil particles and the space between and within soil aggregates. Ideal surface soil that you can walk on or drive a 150 HP tractor on, will be composed of 50% pore space. Volume will be 50% solids (sand, silt, and clay) and the other 50% will be pore space. It is this pore space that is so crucial to the management of air. Air has to move into and out of the soil because roots require oxygen for respiration. Air has to go out of the soil to remove the by-products of respiration (carbon dioxide) and to remove toxic gases such as methane, which will build up in the soil under poorly drained conditions.

Pore space may be divided into two major groups, macropores and micropores. Macropores are those large enough to allow the free movement of air and water due to the forces of gravity downward through the soil. The micropores are pore spaces in the soil

which retain water. In soils that have aggregation, porosity tends to be between the aggregates. If you push the aggregates tighter together through compaction, you decrease the macroporosity far more than the microporosity and hence you influence the drainage characteristics of the soil more than the water retention characteristics of the soil. Macropores are often termed aeration porosity—porosity through which air is transferred in and out of the soil. Micropores are also called capillary pores.

Water content of soil

Maximum water holding content of the soil is when all pores are filled with water (macro and micropores), and there is no air in the soil. It is saturated. It is what microbiologists call anaerobic, because it has no oxygen. Anaerobic respiration takes place, and roots cannot grow because they have no oxygen. Microbes can still grow because there are microbes which can function without oxygen, but these often generate things that are toxic to roots such as ethylene, carbon dioxide, etc. This is what happens to a soil if you get a batch, pulverize it, and then pack it together—you destroy the structure.

Field capacity

Used to describe moisture content or the amount of water retained, field capacity is when all of the macropores have drained out and only the micropores retain water. This depends on a number of conditions such as compaction, granulation, texture, etc.

Permanent wilt point

The water content of a soil when a plant is considered irreversibly moisture stressed. The plant will not recover at this state.

Drainage water

Water in the soil between the maximum water holding capacity and field capacity is drainage water or gravitational water. This is the water that flows out of the soil after it is saturated due to the force of gravity pulling it downward (the forces of gravity pull everything toward the centre of the earth). It is this force which drains the macropores. Therefore, it is the drainage of that water which indicates field capacity. This allows the air to flow back into the soil.

Plant available water

This is the water held in the soil that is available to plants between field capacity and permanent wilt point. Capillary water is another term (water held in the micropores). Drainage does not remove plant available water, it only removes water in the macropores. It does not remove any of the microporosity or capillary water. If you drain your golf course or athletic field, you are not going to decrease the amount of water you use for plant growth. There may still be an occasion 24 hours after a heavy rain when the gravitational water has drained through the system. You may have used some of that water. So, plant available water is that between field capacity and permanent wilt point. Thus, when you are scheduling your irrigation, you should organize it to occur when you have used up roughly 50% of the plant available water. The reason for this is that as the water content of the soil decreases, the energy which the plant roots have to expend in order to extract water from the soil increases quite markedly as you pass the 50% reduction stage. So the drier it is, the tougher it is for the roots to get that water; therefore, never let the plants get anywhere near the wilt point.

When you are scheduling your irrigation, you should organize it to occur when you have used up roughly 50% of the plant available water.

Gravitational flow of water

As already mentioned, gravitational flow of water is only directed down. It is defined as the water between maximum water holding capacity and field capacity, and it flows out through the macropores.

Capillary flow

This is the other type of flow that occurs through the soil. It is the flow through capillaries or micropores. Capillary flow is multi-directional, sideways, upwards, and downwards due to the forces of adhesion and cohesion between the water surface and any other surface. If you have a very fine diameter pore, water will move upward in that pore. That is the whole basis for the physics of water movement by capillary flow.

In the sand rootzone, water is supposed to move upward from the water table to the interface between the sand and the gravel bed and move upward through the plant roots through capillary flow. Water in the soil flows from moist areas to dry areas through capillary flow. It tends to be higher in fine textured materials and most rapid in coarse textured materials. It does not rise to the top in either. When selecting sand for an all sand rootzone, the particle size becomes critical due to the fact it has an influence on how far and how fast the water moves by capillary flow. Usually, failure of sand root systems is due to distribution of the particle size.

To end, there are a couple of other terms that relate to the movement of water in the soil. Infiltration: this is the rate of movement of water into the soil surface. Saturated Hydraulic conductivity: this is the rate of water movement through the macropores. It determines how quickly the soil will drain. Unsaturated hydraulic conductivity: this refers to the movement of water through the macropores. When the soil is saturated, all pores are filled with water. When the water drains, soil pores fill with air which is good for root growth. ♦

Editor's Note

Dr. Sheard's lecture was covered in greater detail in a series titled "Understanding Turf Management." This series was published in the Sports Turf Manager *newsletter starting in June 1991. Some copies are still available in the STA office. This series and others will eventually be available in book form (to be published at a future date).*

The Do's & Don'ts of Renovation, Seeding, and Drainage

GORD DOL

Some of the problems we see are: 1) incorrect materials; haulage 2) incorrect equipment; location of material storage, and 3) dragmatting irrigation lines.

Aeration

- not enough weight on the aerator; more ballast needed
- not a high enough frequency; try to do the job 4-6 times per year
- obtain the right machine for the conditions and soils you are working with (the Verti-Drain is excellent, especially in the spring months)
- know what you are trying to accomplish

Irrigation

- ensure correct installation; check that pipe depth and wire are sufficient
- also check valve boxes, the layout of the heads, and ease of servicing
- sometimes in schools trying to save money, the resident plumber puts in the system and does not understand the implications for safety, etc.

Drainage

We find people install 4" (10 cm) wide tile using a 2' (60 cm) wide backhoe, or they install a system in conflict with the irrigation lines; fittings are of poor quality and incorrect pipe schedules are supplied. Situations also arise where drainage tile slopes away from the mains (thus the grade is incorrect). Couplings on irrigation fittings not snapped together properly can run the risk of pulling apart underground.

We like to have the trench no more than 4" (10 cm) wide than the tile. This creates better support for the machines on your field. Lasers are probably the best invention for installing drainage and if your contractor is not using one, you may wish to ask why not. Lasers are virtually foolproof and easy to operate.

Baseball Infields: Maintenance and Grooming

Many infields are ruined from grooming and travelling too quickly. Much of the material gets pushed into the grass area at the diamond edge and creates a lip all the way around. It is highly dangerous if the ball hits this area. For maintenance of the edges, we recommend the use of a power sweeper about every six weeks. For grooming the edges, we use a sod cutter which makes clean crisp lines. We suggest you do not groom by eye, but use string lines.

Other problem areas can be the pitchers mound and batters' box repairs. In the construction stage, you can use clay brick which is a very good material. A fired clay brick very tightly compressed can be laid out in a pattern. Then another type of material can be placed on top of these bricks. There are many types of sports clay materials available. If you have holes to fill, make sure when you finish you compact them. Add some moisture, take your time, and use a plate tamper. Make sure the people that work on these diamonds have the correct tools. A level is useful, and both an aerator and a sod cutter are very handy.

Fertilization

Clients spend a great deal of time and money going over fields doing soil tests, having an agronomist look at the tests, and developing a program of fertilization which calls for 4-5 applications per year, and then they apply only two. Fertilizer is not that expensive, so put on the blend that is prescribed and make sure you apply the correct amount.

Many municipalities no longer spray for weeds, although some do bring people in to spray. Individuals who do not know what was in the tank previously and spray Roundup on a perfectly good lawn or who use a sprayer that is not working properly with a plugged nozzle that releases too much spray, can do a great deal of damage.

Reconstructing Sports Fields or Building Sports Fields

Probably one of the best publications I have seen on this topic is published by the Sports Turf Association of Ontario, *The Athletic Field Managers' Guide for Construction and Maintenance*. If you don't have a copy of this book, purchase one. It will teach you about sports field construction and maintenance.

continued on next page ...

We have seen a great deal of problems, especially with regard to the resodding of sports fields. Of particular importance is the depth and type of cultivation used when preparing a seed bed for sod. One of the worst machines you can use is a rototiller. They are subject to pulling up and down, depending on the compaction of the area. We like to use a machine called a Meri-Crusher. It's like an asphalt crusher and can be set to the depth you require. With a rototiller, if you wish to go to a depth of 5" (12.5 cm), due to compaction, you may only go down 2" (5 cm) in some areas. Areas you work more deeply will tend to drop or subside more than others not tilled as deeply.

I would recommend a soil test and doing exactly what that test indicates. If you're working the field area to a 6-8" (15-20 cm) depth, you have the opportunity to apply and work into the root zone 1,000-1,200 lbs/acre (1,120-1,344 km/ha) of fertilizer or organic matter in the form of compost. This will bring up the organic matter content. Once you have done all that, you can go over the area again with the Meri-Crusher. You need to pull soil from the edges to build up the crown. Go over with the Meri-Crusher or rototiller once again. This will ensure you do not get an excess of loose material in the crown area and 2" (5 cm) or less on the sides. It is hard to achieve a 1% slope, for example, if the centre of the field sinks and the sides stay the same. If you are sodding, at least moisten to allow rooting to begin before play. If possible, 2-3 weeks for sod, 6 months for seed. As soon as the sod is knitted, we like to use a mechanical core aerator or walk behind machine if field is soft. Even walking, a field can be completed in about 3 hours.

This has been a brief overview of some of the issues we encounter in our daily contact with clients or in situations where we have been called in to troubleshoot a problem. ♦

Most Playground Injuries are Preventable, Groups Say

VIRGINIA GALT

More than 10,000 Canadian children go to hospital emergency wards with playground injuries each year—and most of the injuries are preventable, says the Canadian Parks/Recreation Association.

Hard surfaces such as asphalt, bars spaced so closely that children get their heads caught, exposed concrete bases on play-equipment structures, and cracks that catch jacket drawstrings all contribute to the accident toll, association president Neil Semenchuk said yesterday in launching a national safety program.

"On average, there has been one death a year since 1982," he said in an interview after his Ottawa-based association teamed with the Canadian Standards Association to announce the establishment of a Canadian Playground Safety Institute. The institute, drawing on new playground equipment standards developed by the CSA, will train people as "certified playground inspectors."

Course work at comprehensive, two-day workshops conducted by the new institute will include safe design and layout, proper surfacing, and the identification of hazards and risks.

"Asphalt obviously is not really the ideal surface," Mr. Semenchuk said. "It doesn't have a lot of give if you fall from the monkey bars."

Mr. Semanchuk said he hopes the course will appeal to senior administrators in parks and recreation departments, people involved in the education field, and urban planners. The association also hopes to draw private day-care operators.

Parents generally assume that playgrounds have been certified as safe when, in fact, a lot of playground equipment is outdated or poorly maintained, Mr. Semenchuk said.

The first session of the Canadian Playground Safety Institute was held in Penticton, B.C., in late April, with five more to be scheduled across Canada before the end of the year. The CSA requirements for playground equipment will be published in May.♦

Seedbank Moves to Saskatoon

CANADIAN PRESS

The first half of Canada's seedbank arrived in Saskatoon Saturday—with a military escort.

"This is Canada's national food security—that's why we would enlist the help of national defence to move it," said Ken Richards of Agriculture Canada.The plant material arrived in a Canadian Forces Hercules aircraft.The seeds will be stored at Agriculture Canada's recently-expanded research centre at the University of Saskatchewan.

The other half of the seedbank will be shipped to the city later this month by truck.

The material was moved in two shipments because officials were fearful of losing the entire collection in an accident.

Richards said that while such an accident wouldn't plunge

the country into starvation, it would put Canadian plant breeders at a severe competitive disadavantage.

The bank, created in 1970, has 110,000 samples of seed stored in 550,000 special envelopes.

The federal government decided in 1995 to move the bank from Ottawa to Saskatoon because the city boasts a university with a large agriculture college and a thriving agriculture-biotechnology sector.

There are more than 40 ag-biotech firms located in Saskatoon. They employ 1,500 people and earn more than $100 million in gross revenues a year.

The seedbank includes 43,000 different samples of barley seed and 30,000 types of oats, the largest collection of both cereal crops in the world.It also includes 15,000 samples of wheat seed and smaller amounts of other plant seed—everything from apples to tomatoes.

Plant breeders may borrow seed from the bank as they work to develop new crops. ♦

— Canadian Press April 13,1998

"The biggest mistake you can make is to believe you work for someone else."— Unknown

Still Available from the STA

These two key publications are a must for any sports turf manager:

- Athletic Field Managers' Guide for Construction & Maintenance, $8.00 for members (mailing & taxes included), $12.00 for potential members

- Constructing the Sports Field, a pamphlet jam packed with info for sand based fields, available at a minimal cost

Testing, Testing

LEX VAN DER WEERD

The continuous demand for better varieties of grass means a variety of testing procedures. Who does not recall the five foot downhill putt on the 18th green at Augusta that gave Nick Faldo the US Masters? Who can forget the last service in the tie break which gave Richard Krajicek his first Wimbledon title? How about Gareth Southgate's penalty miss during Euro '96 which saw England out of the competition?

None of this would have taken place without grass. Without grass the world would be a dull place. It is vital for gardens, parks, and roadsides but it's an indispensable part of sport. Imagine football, golf, or rugby without grass!

Market Demands

Better lawns, harder wearing pitches, and shade tolerant varieties—modern stadia demand different and better grass varieties in many respects. The aim of the breeder is to exploit the genetic diversity of plants and select those with the desired qualities. By crossing plants from different backgrounds, it may be possible to select some which inherit the best characteristics from their parents.

The process of breeding and selection is long and complex. To find just one new good hard wearing, shade tolerant variety of grass requires the screening of many thousands of crosses.

Instruments of Torture

One of the main criteria when selecting grasses for sports fields is the ability to withstand a football boot skidding over its surface. A quick look at programs such as "Match of the Day" or "die Sportschau" shows the kind of punishment that can be meted out by 23 pairs of boots.

A special machine is used to test grass for this characteristic. It has three rollers which are pulled across small squares of individual varieties which are laid out to form a complete playing field. It does not sound very stringent until you realize that the middle roller contra-rotates. Its metal studs tear across each variety every three days for a year.

After a few weeks of this severe treatment, some varieties are unable to withstand the "torture" and small bare patches begin to appear on the field. However, some other varieties do very well remaining green and continuing to grow and produce a true playing surface.

New Varieties

Breeding a new variety takes about 15 years. Towards the end of this period, samples of the variety are sent to national independent trial stations such as the Sports Turf Research Institute (STRI) in England, the INRA in France, the BSA in Germany, and the NOC-NSF in the Netherlands. These stations assess all the characteristics of the varieties entered by plant breeders like Barenbrug. Grounds staff are able to select the recommended varieties from lists which are published annually by these institutes.

It isn't just common species for sports fields but also new species that are entered at the independent trial stations. New species are considered to enable new developments in sports turf technology. One of these new species is known as Barcampsia Tufted Hairgrass.

Barcampsia

Deschampsia caespitosa, or Tufted Hairgrass, has been developed from naturally occurring grasses in shady woodland areas. Barenbrug breeders have exploited its ability to grow in shaded conditions and have incorporated a remarkable wear tolerance.

Barcampsia will not compete with other species and blends very well with perennial ryegrass. As ever more new stadia face the problem of shaded pitches, this new species will be able to help alleviate the problem.

Barcampsia has been tested for the last three years at the STRI in Bingley. It has been grown within smooth stalked meadow grass, or Kentucky bluegrass, plots and the latest figures show excellent wear tolerance, shoot density, and fineness of leaf. The STRI performance ratings show a wear tolerance of 7.4, shoot density of 7.5, fineness of leaf of 8.0, and slow regrowth of 1.7.

Barenbrug's Trials

An increasing demand for shade tolerance, drought tolerance, and disease resistance has prompted Barenbrug to set up trials to simulate these conditions. Mixtures are currently being tested using perennial ryegrass, Barcampsia, smooth stalked meadow grass, and red fescues. Mixtures containing Barcampsia are performing better than the traditional mixtures after just one year.

Barenbrug have over 90 years of experience in plant breeding, seed production, and seed trading. They will continue to produce improved varieties and new species adapted to specific demanding conditions. Barenbrug's consultants can offer technical assistance wherever it is needed to support local distributors and their professional end users. ♦

— Lex van der Weerd is the international product manager of Barenbrug Holland BV. This article was first printed in the "Panstadia International Quarterly Report," January, 1997.

WELCOME NEW MEMBERS

Jim Higgs, Town of Markham • **Robert Curry**, Covermaster, Inc. • **Terry McCallum**, City of Sarnia • **Peter Schlei**, Conestoga College • **Mike Van Beek**, Seneca College • **Jerry Friesen**, Town of Grimsby • **Jamie Lowery**, Town of Markham • **Doug Henderson**, Town of Markham • **Ronald Boulton**, Town of Kincardine • **Robert Kennedy**, City of St. Catharines • **Ron Martin**, Mar-Co Clay Products, Inc. • **Malcolm Mascarenhas**, Walker Equipment Limited • **Tom Bellis, Bob Dafoe, & Brant Finlay**, City of Belleville • **Shawn Teahen**, Student, Mitchell Golf & Country Club.

NEWS RELEASE

G.C. DUKE EQUIPMENT LTD. and SMITHCO MFG. are proud to introduce the new and improved Top Liner. The self contained Top Liner is capable of lining, marking, and numbering all types of athletic fields. The compact design and smooth performing hydrostatic drive allows quick response and tight turning. The front and side mounted spray boxes, both with electric lift actuators, allow paint lines to be created from 2" to 5" widths. The Smithco Top Liner has a 150 gallon polyurethane tank with constant jet agitation to maintain proper paint suspension and consistency during line applications. For more information, please contact G.C. DUKE EQUIPMENT LTD. at 1-800-883-0761.

U OF G TURF MANAGERS' SHORT COURSE

The well respected University of Guelph Turf Managers' Short Course held every February has just become a bit more accessible. To meet the heavy demand for the concentrated course, the University of Guelph has added a second session in the fall of 1998 from November 16th to December 11th. Registration is now open for both the fall 1998 and the winter 1999 offerings.

The course, offered for thirty years now, has been quite a challenge to get into for the last two decades.

On November 10th, registration opened at 12 noon for the February 1998 offering and the fifty spots in the course were filled within four minutes. The line-up was like waiting for concert tickets, said manager Peggy Nagle.

" Students started lining up at the door at 2 a.m. By 11 a.m., there were 60 people in line waiting to register. At the stroke of noon, our phone and fax lines went crazy with calls from across Canada."

The intensive four week program is in high demand because of the quality of teaching and the marketability of its graduates, Nagle said.

For more information on the course or to register, contact the University of Guelph, Office of Open Learning, at 519-767-5000, fax 519-767-1114, or email info@open.uoguelph.ca.

COMING EVENTS

3rd Annual Greenkeepers Workshop
Ontario Lawn Bowlers Association
June 2, Gage Park, Hamilton
$5.00/person (lunch served)
Contact: Mr. Rick Davidson
Tel. (905) 387-1717

Ontario Parks Association
Annual Spring Golf Gathering
June 26, Whirlpool Golf Course
Contact: Arthur Beauregard
Tel. (416) 392-0724

1998 Ontario Summer Games
August 13-16, Guelph
Contact: Tim Mau
Tel. (519) 824-GAME or (519) 822-4263

Microscopic Disease for Turf Workshop
July 14, limited space available
Contact: Pam Charbonneau
Tel. (519) 824-4120 x.2597

STA 11th Annual Field Day
August 18, GTI, Guelph
Contact: Lee Heuther, STA
Tel. (519) 763-9431

GTI/OTRF/OMAFRA
Research Field Day and Turf Management Seminar, August 25
Contact: Trudi Ostler
Tel. (519) 767-5009

Ontario Parks Association
AGM & Awards Banquet
September 16-17, Toronto

1st National Parks & Open Space Symposium
September 24-25
Winnipeg, Manitoba

Communities in Bloom
National Award Ceremonies
September 26-27
Winnipeg, Manitoba

SPORTS STA TURF ASSOCIATION