

BY STEVE AND SUZ TRUSTY

## Market downturn forces managers to improve products and operate more efficiently



It's no secret the golf industry has faced tough challenges throughout the past decade. The question is how much has been learned operationally from the market downturn, and how those lessons can be applied to impact growth at each facility.

"The downturn has caused everyone to become better operators," says Steve Skinner, president and c.o.o. of Chicago-based KemperSports, a company that offers services for the design, construction and profitable operation of golf courses. "Ten to 15 years ago, a course could just open its doors, and customers would line up. That doesn't happen now. Out of necessity, the industry has become more sophisticated in many ways to attract and keep customers."

Skinner says many owners have sought professional management assistance to institute these practices.

"A great deal of technology goes into understanding customers, identifying the best ones and their needs and wants, and implementing ways of serving them better," he says. "We've developed programs in database management and customer and marketing relations, worked with those programs in various situations, and identified how to adjust and implement them for specific properties. On the expense side, we've instituted practices for greater efficiency, finding better and less costly

ways to operate a course."

All of these changes make a positive impact not only on the business of golf, but also on the game of golf as the players perceive it, Skinner says.

"These changes will become permanent additions to management practices that will enable the industry to better meet market demands," he says.

Historically, the golf industry has spent money anticipating revenues would catch up to money spent. But since the market downturn, management practices must adjust to reduce or hold the line on operational costs while maintaining or exceeding previous levels of a product's appeal to customers.

### MAINTENANCE EFFICIENCIES

Spencer T. Olin Community Golf Course in Alton, Ill., is an Arnold Palmer-designed public course that opened in 1989 and is operated by Arnold Palmer Golf Management. Located about 30 miles from downtown St. Louis, the course is located in an oversaturated market and competes with courses that are closer to the center of the area's overall population.

Joe Wachter, CGCS, became golf course superintendent of the course in 2003 and has adopted cost-saving management strategies.

"Our course ranks with the best in the



KemperSports tailors database management and customer and marketing relations programs to meet the needs of each course it manages, including Hiddenbrooke Golf Club in Vallejo, Calif. Photo: KemperSports

area,” he says. “Our challenge has been to match the company’s operational philosophy of providing a great playing experience for our golfers while reducing course maintenance expenditures. We’ve implemented reductions of inputs for nonessential areas, converting about 30 acres from once-a-week to once-a-year mowing in areas that add definition to the course without affecting play. That step saved us 16 to 20 hours a week that can be used elsewhere.

“We don’t basket our fairway mowers or

our tee mowers, and we’ve fine-tuned our use of growth regulators to reduce mowing,” he adds. “We use water from a lake recharged by an on-site well to help reduce water costs. We constantly adjust irrigation to fit weather conditions. We’re doing slightly more total greens watering and are using a wetting agent on our greens to improve moisture retention and reduce hand watering of dry spots.”

On the equipment side, Wachter and his staff are extending the life of machines. Instead of retiring a mower, he might keep it as

NEW DISARM™ BECAUSE SPEED IS OF THE ESSENCE.



When you're faced with the threat of brown patch, gray leaf spot, anthracnose and other turf diseases in your fairways and greens, you need the proven performance of new DISARM™ Fungicide. Unlike most strobilurin fungicides, DISARM features fast penetration of leaf surfaces, rapid translaminar movement and enhanced systemic activity for longer-lasting residual control and complete leaf and crown protection. Plus, it's rainfast in as little as 15 minutes. Add it all up and DISARM gives you performance that's equal to or better than the leading strobilurin. To learn more, visit [www.arystalifescience.us/disarm](http://www.arystalifescience.us/disarm) or call 1-866-761-9397.

Disarm™

The Hyperactive Fungicide™

Always read and follow label directions. DISARM and "The Hyperactive Fungicide" slogan are trademarks of Arysta LifeScience North America Corporation. The Arysta LifeScience logo is a registered trademark of Arysta LifeScience Corporation. © 2006 Arysta LifeScience North America Corporation. DSM-008



Arysta LifeScience

Harmony In Growth

a backup for two newer mowers that are used daily. In areas nearby where the company has sister facilities, some of the lesser-used equipment is shared among courses.

“We explore new equipment introductions

to increase efficiency and recently switched to rotary mowers around the greens surrounds, cutting a little higher but getting a better cut faster without lying over the grass,” he says.

Efficiencies in labor management also are

key to controlling costs. Wachter has adjusted staffing levels more closely to peak play periods, with fewer crew members working at the beginning and the end of the season and keeping top crew levels from May through September.

“We’ve become even more efficient when scheduling and assigning tasks, sometimes duplicating or tripling the use of machines to avoid slowdowns for our operators or disruption for our players,” he says. “We keep a list of short time-frame assignments to effectively utilize all labor hours.”

Historically, superintendents were trained to mow from fence line to fence line, Wachter says. But recent trends have forced superintendents to reduce inputs for some of the lesser-played areas and focus their efforts on the middle of each hole.

“In working through the maintenance adjustments we’ve made, I’ve confirmed the importance of connecting with the golfers to get their feedback on how the course is playing,” he says. “It’s their perception of a great experience on the course that keeps them coming back, and it’s our job to make that happen.”



**A TWO-PRONGED APPROACH**


Each course operator must analyze a course’s situation and make decisions to remain competitive and profitable. Boulder Creek Golf & Country Club in Santa Cruz, Calif., is an 18-hole executive course nestled among the redwoods and lakes of the Santa Cruz Mountains, 60 miles south of San Francisco and 40 minutes from Silicon Valley. Its opening in 1961 was welcomed by a steady stream of golfers. But throughout the years, newer courses opened closer to population centers. As the downturn negatively affected golf facilities in the area, course managers increased their marketing outreach and added online discounting. Bill Aragona, president and c.e.o. of the club and one of the five owners of it, adopted new strategies to respond to the downturn. Prior to the market slowdown, he devoted a specific budget amount each year to update the entire facility.

“That was the first area we cut, and little

WE’VE GOT CONNECTIONS


To ISCO HDPE pipe.  
No joints. No leaks.  
No breaks.







Ask about the best warranty in the golf and turf irrigation business!

Stop by Booth 630 at the Golf Industry Show for a HDPE fusion demonstration!





Coming through.

I-800-345-ISCO

www.isco-pipe.com

www.golfcourseindustry.com/readerservice - #36



At the Spencer T. Olin Community Golf Course, Joe Wachter, CGCS, is implementing cost-saving management ideas in equipment and labor areas. Photo: Spencer T. Olin Community Golf Course

by little, our facility started to show it," he says. "After analyzing market conditions, we decided to adopt a two-pronged approach. We determined we needed to update our physical plant in order to invite and be ready to handle increased business. So we're putting additional funds into renovating our kitchen, clubhouse and other amenities. We've also hired a dedicated marketing person and are more aggressively marketing our course and facilities through various venues, including an active presence on the Internet.

"Because we believe the golf course must be in top-notch condition, we maintained full funding for our course maintenance program and will continue to do so," he adds. "But we realize we need to sell the sizzle and the steak - hook them first through more aggressive marketing and then deliver even more than anticipated in the playing experience."

#### RENOVATE TO COMPETE

For many older courses, more aggressive changes are needed to remain competitive. Ron Kitchen, Jr., president and c.e.o. of Crystal River, Fla.-based Barbaron, a golf course building company, says as he noticed a decline of rounds played at individual courses because of oversaturated markets, the company began shifting the scope of its business from new

build to renovation.

"The pressure of new courses within a market leads many of the older courses to renovate to become more modern and com-

petitive," Kitchen says. "Renovation not only provides long-term cost savings by addressing maintenance issues, it also upgrades the amenities to appeal to a broad range of golfers."



## The Turfco CR-10 makes it happen!



Whether you're top dressing your fairway, renovating bunkers or relocating material, the Turfco® CR-10, with a 4 cubic yard hopper, is the workhorse you've been looking for. Its patented three-position switch, cross-conveyor flow control and self-cleaning hopper make it the most effective material handler available. And now the CR-10 is available with WideSpin™ technology — allowing you to deliver light or heavy top dressing applications at unprecedented widths and depths. All this — plus a three-year warranty. The CR-10. Don't start a project without it.

Call 1-800-679-8201 for a free on-site demonstration or video.



THE LEADER. SINCE 1961.

1655 101st Avenue NE • Minneapolis, MN 55449-4420 U.S.A.  
(763) 785-1000 • Fax (763) 785-0556 • www.turfco.com

www.golfcourseindustry.com/readerservice - #37

Whether a golf course is owned and managed by an individual, a group of individuals or a corporation, one thing is certain: It exists as a business to make money. New and different operational efficiencies and effective

management strategies have been adopted because of the challenges caused by the market downturn. These efficiencies and strategies have improved the overall product offered to golfers and appear to have become permanent

changes within the golf industry. GCI

*Steve and Suz Trusty are freelance writers based in Council Bluffs, Iowa. They can be reached at [suz@trusty.bz](mailto:suz@trusty.bz).*

## Development growth to continue slow pace

**W**ith talk of market downturns, stiff competition and operational efficiencies, some might wonder when the next golf course development boom is likely to occur and what factors will cause it?

Well, 1990 can be used as a benchmark year for a relatively balanced supply/demand environment for golf, which allows for reasonable golf course operating profits, says Jim Koppenhaver, president of Buffalo Grove, Ill.-based Pellucid Corp., an information and insight provider to the golf industry.

"From 1990 to the estimated finish of 2006, net supply has risen 35 percent" he says. "During that same period, annual rounds have increased 19 percent, leaving a 16-percent supply-demand gap that needs to be absorbed.

"To return to 1990s equilibrium, either rounds, rates or a combination has to increase by that 16 percent," he adds. "This is reflected in a current average of roughly 33,500 rounds per 18-hole equivalents in 2006, which is down from the benchmark of 38,000 rounds per 18-hole equivalents in 1990. Thus, the average facility has to regain 4,500 rounds a year to get back to health on a rounds-alone basis."

Given that rounds have been relatively flat the past several years, but better than the 2 to 4 percent annual declines of the early 2000s, and the flattening golfer base, Koppenhaver says he doesn't see a substantial increase of rounds soon. But, despite a gloomy looking future for rounds, he says the supply side looks positive because it's flattening.

Joe Beditz, president and c.e.o. of Jupiter, Fla.-based NGF, says new course development has slowed dramatically during the past few years and there will be zero net growth of facilities for 2006. He says this is rational because participation and rounds have been relatively stagnant for about five years.

"New course planning and construction activity indicates that we'll probably average between 100 and 150 new courses a year for the next several years," he says. "And if course closings continue at present levels, we would continue to see zero net growth."

Beditz says new course development during the next five years will be tied primarily to real estate.

"That part of the market has traditionally been fairly stable but, with the current correction happening in the real estate market, the near-term future for real estate-related golf course development has become more uncertain," he says.

Historically, the industry has shown the ability to absorb about 2 to 4 percent new course openings per year through combinations of population growth, organic rounds demand growth and nominal pricing power similar to commonly accepted inflation benchmarks. Using a value of 3 percent per year absorption, the industry will need five or six years

from 2006 to claim reasonable levels of prosperity, Koppenhaver says.

However, the missing link in that projection is that there's no clear catalyst on the horizon to drive growth. The most likely scenario is the aging baby boomer population adding 1.5 percent per year in rounds, he says. The downside is that an increase of rounds will be offset by revenues per round as they qualify for senior discounts, unless operators make smart pricing decisions.

"We don't see any silver bullets in growing the golfer base in any meaningful way to increase that component," Koppenhaver says. "However, the other ray of hope is as new supply pressure abates, modest pricing increases could take hold and the frequency and depth of discounting could level off."

Beditz says courses are unlikely to face a lot more competition, and the industry should be positively affected by aging baby boomers. Over a long period of time, boomers will become a much needed additional source of rounds played for golf facilities. NGF estimates there could be as many as 75 to 100 million additional rounds provided by boomers per year as they age.



Beditz

"But in the meantime, competition at the operations level is likely to remain fierce, and gains in rounds played will come from the competition, rather than from overall growth in rounds," Beditz says.

Aside from supply and demand factors, time and cost, as it relates to golf course construction, also will impact growth.

"For golf to adapt to its consumers' needs, renovations will continue to focus on cost-savings through maintenance efficiencies and player appeal through increased amenities and options for faster play," says Ron Kitchen, Jr., president and c.e.o. of Crystal River, Fla.-based Barbaron, a golf course building company.

Within the next two to five years, Kitchen sees construction focusing on shorter courses with playable segments consisting of fewer holes.

"We're helping introduce the concept of the shorter, 12-hole course designed for faster play at a more affordable price point," he says. "Cost and time savings make golf more accessible as a potential family sport as well as more appealing as a social or business-related activity. A six-hole option could provide that, with 12-hole or 18-hole options available if time and budgets allow it."

All of these options in future development will add to the consumers' golfing experience, Kitchen says.

"If they have a great time, and the cost and time commitment fit their lifestyle, they'll come back to play more often," he says. "It's all a matter of adapting our product to their wants and needs. In the end, everyone wins." GCI

# Insect control is not a game



## Get serious with the imidacloprid option that can't miss



Mallet™ is Nufarm's latest insecticide using the proven technology of imidacloprid to provide long-lasting, residual control on key pests such as white grubs, billbugs, weevils and cutworms in turf plus aphids, mealybugs, leafminers and thrips in ornamentals.

Control of pests can be realized from just one application per year and can be made using foliar or broadcast sprays, soil injection or soil drench. It is an excellent choice for insect control in public outdoor and interiorscaped areas, trees and shrubs as well as spray application on ornamentals.

- ▶ Mallet™ 2F is a 2 lb. flowable concentrate containing 21.4% imidacloprid
- ▶ Long-term curative and preventive action with just one application
- ▶ Available in 2.5-gallon or 60 ounce jugs

800.345.3330 • [us.turf.nufarm.com](http://us.turf.nufarm.com)

™ Mallet is a registered trademark of Nufarm Americas Inc.  
Always read and follow complete label instructions.



Aerification directly reduces organic matter percentages.

ARTICLE AND PHOTOS BY KEVIN J. ROSS, CGCS

# THE RIGHT COMBO

Aerification and topdressing provide the best potential for managing organic matter in sand-based greens

Recently, there's been a lot of discussion about organic matter management in sand-based greens, primarily the U.S. Golf Association-specified green. Research has shown controlling the levels of organic matter in greens will have the greatest effect on the quality, performance and longevity of sand-based greens. Therefore, it's understandable that managing organic matter has risen to the forefront of agronomic management programs for greens.

The first step to control organic matter accumulation is to have a basic understanding of its composition and production. It would be misleading to classify organic matter in greens as only thatch. The organic matter zone within a green can be separated into two distinctive groupings or stages.

First, stage one organic matter can be classified as true thatch, which is composed of the initial dead and dying plant tissue. Stage one organic matter is located just below the turfgrass surface. Generally, it makes up about half an organic matter zone.

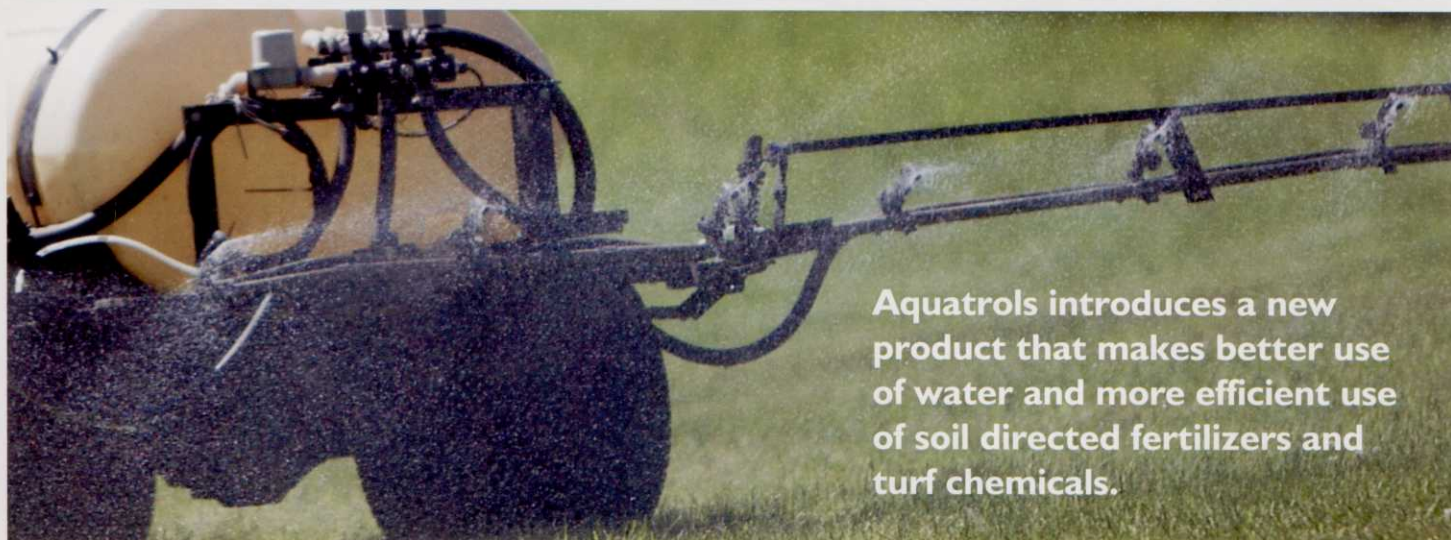
The second group, or stage two, is a material that's humus in nature. This is material





# **SNEAK PEEK**

**Available February 19, 2007**



Aquatrols introduces a new product that makes better use of water and more efficient use of soil directed fertilizers and turf chemicals.

## **Results You Can Expect to See**

- Reduce runoff on sloped turf areas by 20% or more
- Reduce water use on cool-season grass by up to 25%
- Reduce water use on warm-season grass by up to 50%
- Enhance penetration and distribution of water, nutrients and chemicals into the soil
- Improve nitrogen efficiency
- Increase distribution uniformity of irrigation systems in treated areas
- Maintain turf quality at reduced ET replacement rates

## **For when you can't or don't want to inject:**

- 51% sprayable formulation  
Formulated with a higher a.i. for spraying and mixing conveniences
- Less volume to handle and fewer containers
- Tank mix compatible with most fertilizers and turf management chemicals
- Flexible spray rates and application options with one week, two week and three week spray intervals

Visit Aquatrols at GIS in Anaheim, booth 1619, or call your local distributor for information on the new Dispatch Sprayable - available February 19, 2007.



1273 Imperial Way Paulsboro, NJ 08066 Phone (800) 257-7797 Fax (856) 537-6018

# Specimen Label

## KEEP OUT OF REACH OF CHILDREN CAUTION

Read entire label for additional precautionary statements

FOR PROFESSIONAL OR INDUSTRIAL USE ONLY

### GENERAL INFORMATION

DISPATCH SPRAYABLE improves the infiltration and penetration of applied irrigation water and rainfall and can be applied to all fine turf. DISPATCH SPRAYABLE is formulated to be applied by conventional spray rig equipment. For injection through irrigation systems, use DISPATCH INJECTABLE.

### DIRECTIONS FOR USE

#### TURF

Turfgrass grown on soils such as those found on golf courses and athletic fields.

#### Application Rates and Frequency Options

- Spray 8 ounces per acre (0.58 liters per hectare) once a week
  - Spray 16 ounces per acre (1.16 liters per hectare) every two weeks
  - Spray 24 ounces per acre (1.75 liters per hectare) every three weeks
- DISPATCH SPRAYABLE DOES NOT NEED TO BE WATERED-IN FOLLOWING APPLICATION.  
Irrigate before next mowing or leave baskets off.

#### Tank Mixing Rate

For one time application with soil directed chemicals, apply 16 ounces per acre (1.16 liters per hectare). DISPATCH SPRAYABLE is compatible with most turf chemicals. Prior to application, evaluate the tank mix for compatibility and apply to a small area to determine the effect on turf quality.

For more detailed use information, call 1-800-257-7797.

### STORAGE AND DISPOSAL

- Keep container tightly closed. Store in original container only. Keep in a secure and locked storage area. Do not add water to the contents of this container.
- Triple rinse container, empty rinse water into spray or stock tank. Dispose of empty containers in accordance with federal, state, and local law.

### PRECAUTIONARY STATEMENTS

- CAUTION: MAY CAUSE IRRITATION. DO NOT GET IN EYES.
- AVOID BREATHING VAPORS OR MISTS.
- AVOID USING PRODUCT IN A MANNER AS TO DIRECTLY, OR THROUGH DRIFT, EXPOSE WORKERS OR OTHER PERSONS.
- ALWAYS CONSULT THE MATERIAL SAFETY DATA SHEET FOR SPECIFIC INSTRUCTIONS.
- APPLICATORS AND OTHER HANDLERS MUST WEAR GOGGLES OR A FACIAL SPLASH SHIELD; CHEMICAL RESISTANT GLOVES, SUCH AS NITRILE RUBBER ≥ 14 MILS OR NEOPRENE RUBBER ≥ 14 MILS; COVERALLS OR LONG SLEEVED SHIRT AND LONG PANTS; SHOES PLUS SOCKS.
- KEEP OUT OF REACH OF CHILDREN.

### FIRST AID MEASURES IN CASE OF CONTACT

- **EYE CONTACT:** DO NOT RUB EYES. Immediately flush eyes with large amounts of water for 15 minutes lifting the lower and upper lids. Seek medical attention if necessary.
- **SKIN CONTACT:** Remove contaminated clothing and immediately wash affected area with large amounts of water for at least 5 minutes. If irritation or redness persists, seek medical attention as needed.
- **IF SWALLOWED:** Give large amounts of water to drink. Seek medical attention if necessary. Induce vomiting only upon advice from a physician.
- **INHALATION:** Move individual to fresh air and check to assure adequate respiration. Seek medical attention if necessary.



### Guaranteed Analysis:

Active Ingredient	30.0%	Alkoxylated polyols
	21.0%	Glucosethers
Inert Ingredient	49.0%	Water

All ingredients are exempt from the requirements of a tolerance as specified in 40 CFR 180.1001 ©.

U.S. Patent Number: 6460290  
European Patent Number: 0968155  
Patents pending worldwide



NOT A PLANT  
FOOD INGREDIENT

### Contents:

#### US Volume

- 2 x 2.5 Gallon
- 30 Gallon
- Other

#### US Weight

44.55 lbs  
267.3 lbs

#### Metric Volume

- 2 x 10 L
- 115 L
- Other

#### Metric Weight

20.21 kg  
116.2 kg

In case of emergency or spill contact CHEMTREC: 1-800-424-9300  
or 1-703-527-3887 (International Customers Call Collect)

Lot No.:

NJTSRN 26934800000-5089

IN CASE OF EMERGENCY OR SPILL  
Contact CHEMTREC at 1-800-424-9300  
(International 1-703-527-3887, Call Collect)

Applicators and other handlers should wash hands before eating, drinking, chewing gum, using tobacco or using the toilet. Remove protective clothing and equipment after handling. Wash the outside of gloves before removing. Wash thoroughly and change into clean clothing.

For technical information and Material Safety Data Sheet (MSDS), contact Aquatrols, 800-257-7797 or visit our website, [www.aquatrols.com](http://www.aquatrols.com)

### CONDITIONS OF SALE LIMITATION OF LIABILITY AND REMEDIES AQUATROLS CORPORATION OF AMERICA, INC.

Injury to the crop to which the product is applied may result from the occurrence of extraordinary or unusual weather conditions, the failure to follow the label directions or good application practices, all of which are beyond the control of the seller. In addition, failure to follow label directions may cause injury to other crops, animals, man, or the environment.

This product is to be used and applied according to the label directions by professionals trained in the use of agricultural chemicals.

This material is not intended for use by, nor should be used by, consumers. The seller warrants that this product conforms to the chemical description on the label.

The seller makes no other warranties or representations of any kind, expressed or implied, concerning the product, including no implied warranty of merchantability or fitness for any particular purpose, and no such warranty shall be implied by law.

The exclusive remedy against the seller for any cause of action relating to the handling or use of this product is claim for damage, and in no event shall damages or any other recovery of any kind against the seller exceed the price of the product which causes the alleged loss, damage, injury or other claim. The seller shall not be liable and any and all claims against the seller are waived, for special, indirect, incidental or consequential damages or expenses, of any nature including but not limited to, loss of profits or income, or any liability incurred by the buyer to any third party in any way arising out of or relating to the handling, repackaging from original container or the relabeling by the buyer or user, or use of this product, whether or not based on the seller's negligence, breach of warranty, strict liability in tort or any other cause of action.

The seller offers this product and the buyer and user accept it, subject to the foregoing conditions of sale and limitation of warranty, liability and remedies.

Information regarding the contents and levels of metals in this product is available on the internet at <http://www.aapfco.org/metals.htm>.

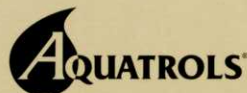
### Aquatrols Performance Guarantee

Aquatrols guarantees you will be satisfied with the performance of this product when used as directed, or your money back. Simply send proof of purchase and a brief reason for dissatisfaction to Aquatrols, 1273 Imperial Way, Paulsboro, NJ 08066, USA.



1273 Imperial Way, Paulsboro, NJ 08066 USA  
1-800-257-7797 • [www.aquatrols.com](http://www.aquatrols.com)

11/06



1273 Imperial Way Paulsboro, NJ 08066 Phone (800) 257-7797 Fax (856) 537-6018

# GOLF COURSE<sup>®</sup> INDUSTRY

## More Comprehensive Industry Coverage

We're excited to expand our coverage of the marketplace through the new *Golf Course Industry* magazine. Some new features include:

- **Extensive Agronomic Research** – Each issue of *Golf Course Industry* will include at least two scientific research stories written by university personnel who are at the forefront of industry research. Each article will be accompanied by business perspective.
- **Consumer Research** – Exclusive consumer research will be included in each issue to give you insight into what golfers are thinking.
- **Added Business Information** – *Golf Course Industry* will enhance its industry business coverage including more information you can apply day-to-day on your course.

## Continuing our Tradition of Excellence

Recent awards include:

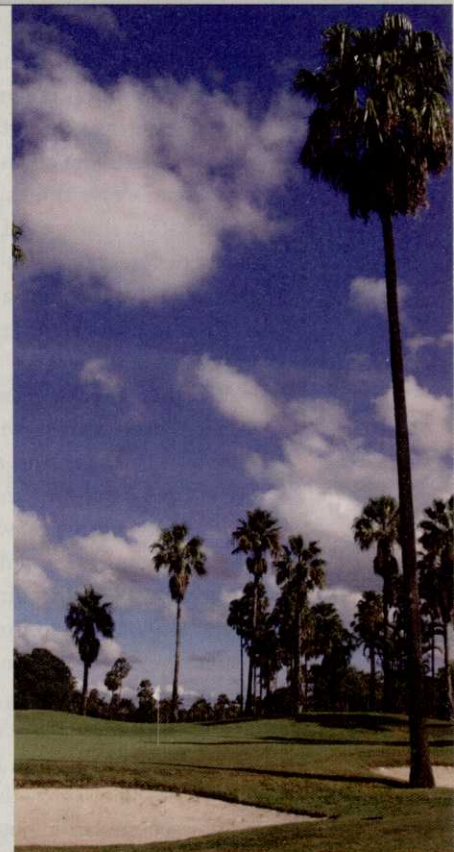
**Ohio Excellence in Journalism**  
Best Trade Publication

### **Turf and Ornamental Communicators Association (TOCA):**

- Gardner Award – Overall Design/Publishing
- First Place – Overall Magazine Design
- First Place – Writing, Product Information
- Merit – Writing, Turf Feature Article
- First Place – Printed Magazine, Cover Page Design
- Merit – Electronic Publishing, Overall Company Web Design

### **Folio's National Excellence Awards:**

Eddie Award: Bronze, Recreation & Sports B to B



[www.golfcourseindustry.com](http://www.golfcourseindustry.com)



Sampling all greens on a golf course can determine potential problems with individual greens.

that has undergone the entire degradation process. Stage two material is located in the bottom half of an organic matter zone and might be the most important area of this zone. It's composed of much finer textured material, which can cause extensive clogging of pore space within that area of the root zone. Presently, turfgrass researchers are investigating this stage-two layer and are only beginning to understand its dynamics in the performance of greens.

When it comes to organic matter accumulation in a sand-based growing environment, the odds are stacked against a turfgrass manager. When one combines an amazing ability to produce organic matter with a sterile growing medium (sand), accumulation can happen at a rapid rate. Dealing with this sterile, sand-based growing environment also limits the potential speed of organic matter degradation. The faster a plant grows, the quicker organic matter builds up. Therefore, each time turfgrass managers fertilize, it has a profound effect on the plant's growth rate and its organic matter accumulation potential.

As an example, when greens are constructed

of an 80/20 root-zone mix, the organic matter content of that initial mix is about 0.7 percent by weight. Researchers have identified that within only a few short years the amount of organic matter skyrockets to a 3- to 4-percent range in the upper surface of a green.

#### CONTROL

Controlling organic matter accumulation in greens is achieved primarily through two methods: physical removal of the material and dilution of the material. Physical removal involves cultural practices, primarily core aeration and dethatching (liner aeration). Diluting the organic matter is achieved by adding sand via topdressing.

How much aeration is needed to control the buildup of organic matter is something most turf managers have guessed about for many years and really don't have any scientific basis to support their decision. The best information about the degree of aeration needed to control organic matter on sand-based greens comes from Robert Carrow, Ph.D., at the University of Georgia. His work was funded by a research grant from the USGA and is titled "Surface Organic Matter in Bentgrass Greens."

Carrow's research determined that a 4-percent level of organic matter by weight in the upper 2-inch zone is a breaking point for the performance of greens. He cites that a level greater than 4-percent organic matter should send a red flag to golf course superintendents, indicating potential problems could be on the horizon. His work points out, however, that the 4-percent guideline isn't a steadfast rule. Carrow indicates that in cooler climates greens might do fine above 4-percent organic matter. However, it can be especially critical in the southern-most zone where bentgrass can be grown.

This research is significant because it provides superintendents with a number to use

**When it comes to organic matter accumulation in a sand-based growing environment, the odds are stacked against a turfgrass manager. When one combines an amazing ability to produce organic matter with a sterile growing medium (sand), accumulation can happen at a rapid rate.**