Tools of the Trade

THE WORLD OF MAINTENANCE IN '98

The agony and the ecstasy. Misery and joy. Superintendents got the complete package in 1998.

There were the horrors, the struggles and the challenges that accompanied drought and then flood in the South Central states, the fire and then hurricanes in the Southeast, the torrential downfalls from El Nino in the West, and the Ice Storm of the Century in the Northeast. Fairways and roads were washed away, clubhouses burned down, disasters of historic proportions.

Then, there were the thrills of discovering a control for poa annua and moss, and of building golf courses to serve as laboratories to study the effects of maintenance on the environment.

Golf course maintenance is a dynamic field, demanding that superintendents read up and pay attention to the many scientific advances. The next few pages share a glimpse of the top GCN stories from the year.

Biorationals: A tide of the future in turfgrass care

GCN JANUARY

By MARK LESLIE

COLUMBUS, Ohio — You may not find the "neem tree" in your dictionary. Nor the words "biorationals" and "naturalites." But they will be playing increasingly important roles in golf course maintenance, according to Dr. Parwinder Grewal, an assistant professor of turfgrass entomology for the Ohio State University (OSU) Extension Service.

Speaking at the Ohio Turfgrass Foundation Conference here, Grewal said some biological controls have succeeded and some have not, but their use has increased tremendously in the last decade — a harbinger of the future.

Piecing together research from OSU, Cornell University and other colleges, Grewal updated the audience on research done on biologicals and biorationals. He defined biological control as the use of a living organism — such as

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Moss: Superintendents' brainstorming pays off

GCN APRIL

By TERRY BUCHEN

SHARON CENTER, Ohio — Research and subsequent answers to turfgrass problems are not always resolved by universities. A great example of networking information has occurred from superintendents, U.S. Golf Association (USGA) agronomists and university scientists nationwide who got together to beat moss.

Chairing the database networking information was D. Frank Dobie, general manager and superintendent at The Sharon Golf Club here. Dobie wrote an article in September 1996 in Northern Ohio Turfgrass News about using a combination of Subdue 2E, wetting agent and spreader sticker, and the database was formed soon thereafter when many superintendents expressed interest in doing further experimentation.

"The most effective method and material in terms of moss

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Notable Quotables

• 'I'd like to get my hands on a 200-acre farm and see what kind of a golf course I could build. Something tells me it would be a little unorthodox.'

— Ed Michaud, superintendent at Sugarloaf Golf Club in Maine, who in the winter at Sugarloaf has built the No. 1 snowboarding resort park in North America, filled with "pipes," "table tops" and "pyramids."

• 'I would parallel it [control for *poa annua*] with new drugs for killing cancer tumors. That's how important it is to me."

— David Major, superintendent Del Mar CC in Rancho Santa Fe, Calif.

• 'It was scary from the standpoint that I didn't think fire could travel that fast. You could not outrun it.'

— Michael Fabrizio, director of golf maintenance and construction for Matanzas and Palm Coast Resort in Daytona Beach

• 'It sounds odd, but we would love a hurricane or tropical storm right now.'

— Bruce Berger, superintendent at Quarry Golf Club in San Antonio, Texas, not long before Texas was hit by a series of storms.

• 'Our single biggest spring-prep problem is keeping the golfers off the course until the frost thaws out.'

— Jerry Faubel, super at Saginaw (Mich.) CC

GCN JULY

Earthworm fixes...

By DR. DANIEL A. POTTER

Earthworms have been called the "intestines of the earth" because of their importance in breaking down plant litter, recycling nutrients and enriching the topsoil. But on golf fairways, an abundance of earthworms can be too much of a good thing.

Generally, you'll have much healthier turfgrass where earthworms are abundant. Their burrowing reduces soil compaction and improves air and water infiltration. Earthworms enrich the soil with their fecal

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GCN JANUARY

New biologicals...

By MARK LESLIE

COLUMBUS, Ohio — Questions abound in the arena of turfgrass soil ecology and biology, but Dr. Michael Boehm pointed to a future where biological care plays an equal role in maintenance with chemical and cultural care and the turfgrass' genetic resistance.

The Ohio State University (OSU) assistant professor of plant pathology painted a picture in which current maintenance practices are dominated by chemicals, and where cultural practices

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GCN APRIL

... Sunlight assessment

By MARK LESLIE

PROVIDENCE, R.I. — Sunlight assessment and digital imaging — two new technologies that are pulling golf superintendents into the computer age — will also help them deal with the difficult task of course renovations, according to a spokesman for the U.S. Golf Association Green Section.

"Frankly, most of the people here have the equipment and capabilities to operate this technology," Dave Oatis, director of the Northeast Region, told the New En-

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Universities pioneering the way

GCN JUNE

Purdue pursues research

By MARK LESLIE

WEST LAFAYETTE, Ind. — With the help of course architect Pete Dye, multiple donors and a group of students who built it, Purdue University on June 27 will open a golf course that will produce a major five-year study on the effects of golf maintenance on ground and surface water.

Pointing out that environmentalists criticize past corporate-funded studies as biased, Dye said: "What Purdue produces should be the most unbiased report, simply because there is no reason to be biased. Good or bad, no one can argue the findings."

All the money to build the new Kampen Golf Course and fund the research came from private sources, not golf associations or the chemical industry. "I was very much concerned that it not be company funds," Dye said. "We did this with Clemson University at the Ocean Course at Kiawah [in South Carolina], but Kiawah was a pristine piece of ground, so how

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GCN JUNE

K-State a new breed

By MARK LESLIE

MANHATTAN, Kan. — A new breed of college curriculum, one that opens management avenues to future golf course superintendents, will begin with construction of a prototype Tournament Players Club (TPC) university course at Kansas State University here.

Colbert Hills Golf Course, named for PGA Senior Tour player Jim Colbert, will be many things to many people.

"The positive impact of this project will be far-reaching," said Stephen Mona, chief executive officer of the Golf Course Superintendents Association of America (GCSAA), "a golf management program to train tomorrow's leaders, a research facility to aid the golf industry, and a first-class facility for golf enthusiasts..."

It will provide "unique research and academic opportunities for K-

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GCN APRIL

UCal Poly transforms trash

By DOUG SAUNDERS

POMONA, Calif. — Dealing with society's trash is an issue that draws little attention from the public until a landfill needs to be created or closed down. After operating a 200-acre landfill on campus property since 1957 in conjunction with the Los Angeles County Sanitation Districts, California State Polytechnic University here hopes to close the landfill and build an 18-hole golf course that will serve as a living laboratory.

The landfill has served two purposes over the last four decades. It has been a repository for the tons of refuse from the growing LA metropolis, and has served as an outdoor lab for waste management, environmental sciences, engineering and agriculture.

"The landfill has been very beneficial to the university from not only an economic standpoint, but also as an educational tool," said Ed Barnes, executive director of the Land Lab and Asset Development for Cal Poly Pomona.

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Earthworm fix

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matter, called castings. Their feeding breaks down thatch while mixing topsoil into the thatch layer, enhancing its suitability for turfgrass growth. Thus, earthworms perform a function much like mechanical topdressing. Their activity encourages microbes that further decompose thatch and enhance soil fertility.

Conservation of earthworms is important in lawns and other turf sites where thatch is a concern.

However, on golf courses, mud mounds abound where earthworms have pushed up castings through close-mowed grass. Golf cars and mower tires compact these mounds, smothering patches of grass. Golfers' drives may stop short on worm-softened fairways, and golf balls may be muddied where they land. Mower blades are dulled, and mowers return to the maintenance complex caked with mud.

Strictly speaking, U.S. turf managers cannot apply pesticides for earthworm control because no chemicals are labeled for such use. However, several products will kill a portion of the earthworms as a non-target effect when they are applied for control of insects or diseases listed on their labels.

According to our research, the insecticides *bendiocarb* (Turcam), *carbaryl* (Sevin), *ethoprop* (Mocap), or *fonofos* (Crusade) are toxic to earthworms. Any of these products, applied at rates labeled for grub control and watered in (1/2 to 1 inch of irrigation), generally will give an 85- to 95-percent reduction of earthworms.

The fungicide *thiophanate*-methyl (Cleary's 3336) provided similar suppression. The impact is greatest if the application occurs when the soil is moist and the earthworms are active near the surface. One application often will reduce casting activity for 2 months or longer, not from residual toxicity, but because the earthworms are slow to reproduce or recolonize treated areas.

Most earthworm species are intolerant of acidic soils. Application of aluminum sulfate or sulfur to lower the soil pH to 5.8 or less may reduce their population.

Biologicals

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and genetic resistance dwarf biological controls.

"We want to get all spheres relatively the same size to give turfgrass managers the ultimate and largest arsenal to combat turfgrass diseases," Boehm told an audience at the Ohio Turfgrass Foundation Show and Conference here.

"Our goal," he said, "is the integrated management of diseases ... to push the responsible use of biorational, environmentally friendly and environmentally sound chemistry — whether it's synthetic or from a natural origin — and to better understand and increase the use of biologicals."

Composts add nutrients and micro-organisms to soil that have been shown to control or counter pathogens, he said. The focus of research at OSU and other universities is understanding how and why diseases are suppressed.

"We know that if you increase the nitrogen level on turf you can suppress dollar spot nearly 60 percent," Boehm said. "But there are still lots of issues. Is the nitrogen in the form we are applying it directly toxic to the pathogen? Or is the nitrogen giving the plant the ability to outgrow the pathogen? Or is the nitrogen somehow changing the physiology of the host, thereby making it less susceptible?

"Those are all very valid questions that we'd like to address."

From a plant pathologist's perspective, he said, mechanisms of biocontrol are:

- competition between the biological control agent, or the organism that is suppressing the pathogen for space or nutrients;
- antibiotic production, since the biological control agent produces antibiotics that are toxic to the pathogen;
- hyperparasitism, wherein the biocontrol agent uses the pathogen as a food base or energy source; and
- induced resistance — "an area," Boehm said, "we don't understand very well, but the presence of these beneficial organisms brings about a physiological, or biochemical change in the plant that renders the plant resistant."