

# Biologicals & biorationals: An emerging world in turf

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 insect-pathogenic nematodes, bacteria or fungi — to control a pest insect.

Biorationals — a new word in golf course lexicon — are products of natural origin that are safe to non-target organisms. The Environmental Protection Agency calls them pesticides with different modes of action than conventional pesticides, with higher selectivity and lower risks to humans and wildlife.

Researchers are delving into these fields in response to concerns about human health and safety, environmental and ground-water contamination, and the impact of chemicals on wildlife, fish and beneficial organisms.

Biorationals include botanicals, microbial elements and synthetic chemicals with alternative modes of action.

Grewal spelled out various findings of research into biologicals, including:

- Nematodes of the genera *steinernema* and *heterorhabditis* fight armyworms, webworms, black cutworms and white grubs that feed near the surface. They can become part of the environment if not exposed to toxins.

- The fungi *beauveria bassiana* infects chinch bugs under hot, humid weather. The product, named Naturalis-T, had limited success in 1997 trials.

- The bacteria *bacillus popilliae* (the milky disease) is a natural pathogen of white grubs. It is highly specific and different strains infect different grub species. Infected grubs die in a month. The products are Doom, Japidemic and Milky Spore. Grewal said the quality of current products is questionable.

Among biorationals, Grewal said:

- Of the microbial derivatives, *cacillus thuringiensis deltu endotoxin* is the most widely used microbial insecticide on the urban landscape. New products with encapsulated toxins have become available, Grewal said, and research is continuing to incorporate *delta endotoxin* genes.

The *buibui* strain of *bacillus thuringiensis* variety *japoneensis* provides excellent control of the Japanese beetle and white grubs.

- Naturalites — a new class of insecticides — are active on lepidoptera, diptera, hymenoptera, siphonoptera and thysanoptera.

- Conserve SC, a product from the microbial derivative

*spinosad*, has performed well against cutworms, armyworms and sod webworms.

- DiTerra, a new biological nematicide, has not been tested yet at OSU, but is “widely accepted for turf nematodes.”

- Among plant derivatives, *azadirachtin*, from the neem tree, acts as a growth regulator

and as a feeding deterrent to some insects.

- Of the phenyl pyrazoles, Fipronil is effective against mole crickets and fire ants. The product: Chipco Choice.

- The product Merit, from



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## Panel on disabled scheduled for GCSAA Conference and Show

By Bob Spiwak

The Golf Course Superintendents Association of America (GCSAA) has scheduled a round table discussion entitled "The Americans with Disabilities Act (ADA) and Golf Courses" for its February convocation in Anaheim, Calif.

Set for 2-5 p.m. on Friday, Feb. 6, the panel will include Greg Jones, president of The Association of Disabled American Golf-

ers; Jerry Coldiron, superintendent at Lassing Pointe Golf Course in Kentucky; and Peggy Greenwell of the U.S. Department of Justice.

According to Cynthia Kelly Smith, government relations counsel for GCSAA, several

other participants have been invited. Smith said that she gets a call each week from a superintendent somewhere about the ADA.

The GCSAA convention program notes, "This government relations program will feature

a panel of experts discussing the ADA and its impact on golf...compliance issues, case studies, advice on handling complaints and the status of the government's draft golf access guidelines are a few of the topics that will be covered

in this interactive, topical session."

Smith noted that the ADA involves not only superintendents, but architects, the rules of golf, and the way golf is played.

"More superintendents need to be aware (of ADA ramifications) and they need answers," he said. "We are hoping to work with the disabled community and we all agree this [forum] will be a good way."

## Biologicals and biorationals are emerging

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*chloronicofinyls imidadoprid*, is very effective as a broad-spectrum, long-residual insecticide.

- The *halofenzide* Mach 2, a molt-accelerating compound, gives excellent control of white grubs, billbugs and beetles.

The synergism between the Cruiser nematode and Merit (used at 1/10th the recommended rate) provides 100-percent control of Japanese beetle grubs, Grewal said.

Grewal warned that *fipronal* had an adverse effect on the natural population of nematodes.

The OSU professor said more work needs to be done in a number of areas, especially on fungi and bacteria biologicals as well as to develop products to control white grubs.

"We need to try to understand the naturally occurring biocontrols that are already there and easy to establish... They save water, the environment, money and much more," Grewal said.

## Rieke: Are your roots in sand?

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a micronutrient package.

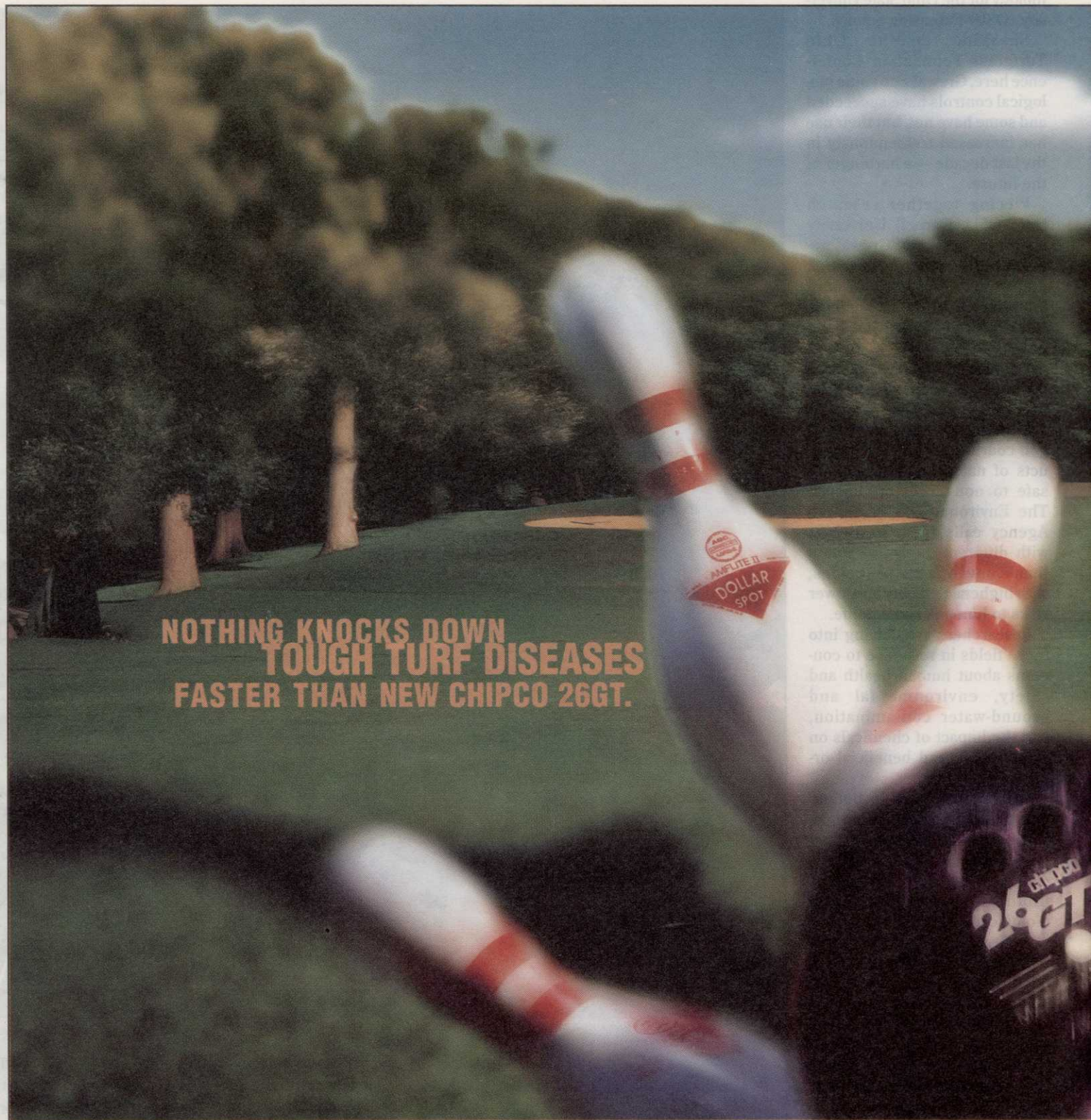
He suggested that superintendents look at soil-ratio tests. Calcium (Ca) should have a 60- to 85-percent saturation in soil test reports, magnesium (Mg) 8 to 12 percent and potassium (K) 5 to 8 percent.

The ratios, Rieke said, should be less than 6.5:1 for Ca:Mg; less than 13:1 for Ca:K; and less than 2:1 for Mg:K.

"Are we overfertilizing?" Rieke asked. "Maybe we are."

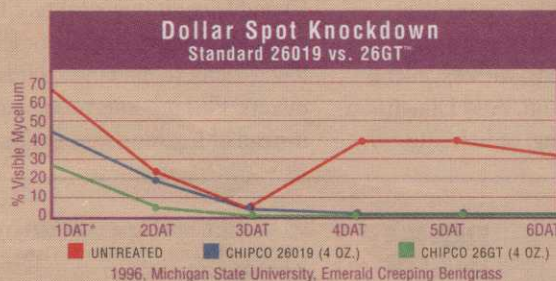
He said granular fertilizer should be applied to sand greens in the spring and fall, including some slow-release material; and the turf should be spoon-fed during prime playing season, using mostly soluble fertilizer with sprays through the irrigation system.

Finally, he said superintendents should "do all you can to get oxygen into the soil," adding that is an important factor that has been overlooked.



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