



LETTERS TO THE EDITOR

**Should costs be included?**

*Turf Grass Trends* is super! I thoroughly enjoyed your premier issue. It fills a niche not addressed by current publications.

What's particularly amazing is the almost complete absence of errors or mistakes. However, I did stumble across one. In his excellent article on Pythium diseases, Dr. Nelson does a great job of explaining Pythium root rot. Unfortunately, there is an error on Page 4 regarding the relative cost of Pythium control products. Aliette fungicide is considerably more expensive than indicated. Using a \$12 per lb. retail price, Aliette's actual cost per thousand is \$3.00 and \$6.00 at 4 + 8 oz. rate, respectively.

You may want to clarify this with Dr. Nelson and Rhone-Poulenc (the manufacturer of Aliette); I'm confident they are interested in an accurate portrayal. In the future, you may want to discourage cost comparisons since it is almost impossible to make accurate comparisons based on suggested list prices, special promotions, local availability, etc.

Again, congratulations on a successful first issue and good luck!

— L. DOUGLAS HOUSEWORTH, PH.D.  
Man. Tech. Support, Turf & Ornamental Dept.  
CIBA-GEIGY, Greensboro, North Carolina

*We appreciate the encouragement and the correction. You are right about the costs of applying Aliette.*

*Despite all the variables involved in the real world prices that end users pay for products, we believe that a comparison of the costs is essential. After all, costs are a major factor—especially since a lawncare operator may not be able to charge enough for a application to warrant using a more expensive material—regardless of its potential benefits. These price indicators are simply that—indicators of the approximate price range.*

*However, given the variables you noted, in the future, we will include a disclaimer (see chart page 3).*

**Drift agent is available**

Let me congratulate you on what appears to be an informative and useful product.

In your On the Horizon column, you spoke of drift control agents. Please note that Rockland Corp. has been selling Rockland Target Drift Retardant for the last two years. This is a highly concentrated drift and mist retardant that can be added directly to spray mixes.

— ROBERT K. WITTPENN  
Rockland Corporation  
West Caldwell, NJ

## The diagnostic art

by Christopher Sann

**D**ESPITE ALL THE SCIENTIFIC technicalities involved in diagnosing turf problems, like virtually every other specialized form of problem-solving, it ultimately is an art. Sure, it requires skills that are gained by trial and error, which is the basis of science. It also requires a healthy dose of curiosity, which motivates our willingness to go through trials and errors in the hope of gaining new knowledge. However, being good at diagnosing turf problems also requires certain personality traits or habits of thought that have more to do with art than science or technology.



These traits may boil down simply to being a person who likes growing things, and taking care of them. What's the reward? When things go right, we see beauty. That is what a healthy, well-maintained stand of turf is—a thing of beauty. Many people in the field probably don't recognize the artist in themselves, but this artistic aspect of turf management is what drives our desire to do better, to achieve a higher level of quality—to manage to make the green spaces we care for more beautiful.

Developing a diagnostic sense should involve a system of financial as well as psychological rewards, but the essence of craftsmanship is that it helps us to feel good about ourselves and what we do—even if the financial rewards aren't always what they should be. When an area responds to what you have done to it, seeing how beautiful it looks provides an on-the-spot reward that is every bit as essential as the technical know-how involved.

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**Honest evaluation requires both the courage of convictions—the ability to make decisions—and the humility required to recognize when those convictions and decisions didn't work.**

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The actual process of diagnosis starts with a keen sense of observation and a willingness to search and research for relevant information. Formulating action plans—deciding what the problem is and what you are going to do to correct it—combines these first two activities. As anyone who has tried knows, applying book knowledge amid the complexities of the field isn't a simple process.

Carrying out your plans is relatively straight-forward, but it too has to be done with care. "Measure twice, cut once"



is an expression that carpenters use to make this same point.

The next step is evaluating the results of those actions. Let's face it—learning from your mistakes is not as easy as it sounds. Evaluation takes patience. You have to develop a sense for how long to wait and see—how long to give the action you took before you do something else.

Honest evaluation requires both the courage of convictions—the ability to make decisions—and the humility required to recognize when those convictions and decisions didn't work. Even scientists, who work by conducting experiments and drawing conclusions from the results, frequently have difficulty admitting their errors. The process can take generations. The diagnostic art is not something that can be handed down wholesale from one individual to another—especially given today's rate of change. Today's latest discovery may become tomorrow's discarded fallacy. That's why keeping up—continuing education—is important in virtually every field of endeavor.

Classroom learning can help. Books or magazines—or newsletters like this one—can help. But diagnosing complex diseases in the field—where the full array of environmental and site-specific factors and co-factors are at play—takes something more than second-hand knowledge, however accurate or insightful it may be. After all, the field is where many a theory has been disproved, many a product has failed to produce the sought-after result, and many decisions have to be made right now—no matter how little or how much we think we know about turf management.

So diagnosing turf problems takes a personal awareness of what is going on around you. Doing it well takes digging, probing, smelling, feeling, reading, and getting your hands and your knees dirty. You have to be willing to ask questions and—somehow—know when to accept the conventional wisdom and when to reject it in favor of your own gut feeling.

As with all skills, some people are better at it than others. Diagnosing problems is a skill that grows through personal experience. It can be aided by the growing body of knowledge about turf and its ecology, but nothing can replace it. ■

## Turf Grass TRENDS



*Turf Grass Trends* is published monthly by the Turf Information Group, Inc.  
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For credit card subscription information only, call 1-800-645-8873. Subscriptions are \$120 per year for a single subscription and \$100 per year for multiple subscriptions. *Turf Grass Trends* accepts no advertisements. Unsolicited manuscripts are not accepted. © 1992 Turf Information Group, Inc.

### LETTERS TO THE EDITOR

Please write to address above and include a return address. As space allows, we will respond to the letters we publish. We reserve the right to edit all letters. All published letters become the property of *Turf Grass Trends*.

## REGULATORY WATCH



### Federal legislation tops summer regulatory agenda

TWO IMPORTANT, RELATED PIECES of legislation are working their way through the Congressional committee process this summer: the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and the Pesticide Safety Improvement Act (HR3742).

FIFRA, which includes rules governing certification and training, is up for re-authorization. The key features of the Pesticide Safety Improvement Act include:

- REQUIRING MORE TRAINING for commercial pesticide applicators
- INCREASING FINES FOR VIOLATIONS
- PRE-EMPTING OF LOCAL PESTICIDE USE regulations with state and federal rules.

The law would also require training of state enforcement personnel.

Both bills have the support of the Professional Lawn Care Association of America (PLCAA). In testimony before the sub-committee on Department Operations Research and Foreign Agriculture (DORFA), PLCAA supported increased training requirements; customer right-to-know, notification of application, and customer service agreement rules; and national regulation of the lawn care industry. It opposed increased fines, which would be raised from \$5,000 to \$25,000 by the currently proposed version of HR3742.

Right to know regulations are currently administered under the Emergency Planning and Community Right to Know Act, which primarily focuses on the storage of toxic chemicals, and PLCAA testified that FIFRA is a more suitable place for these regulations. Right-to-know and related rules are particularly important to the lawn care industry, because of its visibility—to both customers and neighboring non-customers.

For additional information, or to add your voice to lobbying efforts, regarding these bills, contact your U.S. Representative's office. ■

### ASK THE EXPERT

HAVE A QUESTION on any aspect of turf management? Send it to: Ask the Expert, *Turf Grass Trends*, 2070 Naamans Rd., Suite 110, Wilmington DE 19810-2644 or fax it to (302) 475-8450. If we can't answer your question, we will put it to the best available expert on the subject.



### Turf events in New York

THE FOLLOWING UPCOMING EVENTS of interest to turf managers in New York and surrounding areas are scheduled:

#### ■ Cornell Turfgrass Field Day, July 1

Pine Island, NY, NY State Turf Assn., (800) 873-TURF

Research updates on water management, annual grass weed control in new seedings, turf renovation, and other topics—plus 125 varieties of Kentucky bluegrass shown in high maintenance demonstration trial. The fee is \$20 if you register by June 24, or \$25 on-site.

#### ■ Turfgrass Management Seminar, July 30

Saratoga Sod Farm, NY State Turf Assn., Stillwater, NY, (800) 873-TURF

Talks on installation and maintenance of sod on athletic fields, the non-target effect of fungicides, and new technology for applying insecticides and other materials below the soil surface. Dr. Eric Nelson, *Turf Grass Trends* Associate Editor, will discuss late July turfgrass diseases and the latest—use of aerial photography as a diagnostic tool for golf course greens. The fee is \$25 for members of sponsoring organizations and \$32 for non-members.

#### ■ Turfgrass Field Diagnostic Course for Golf Course Managers, Aug. 4-6

Cornell University, Ithaca, NY, J. Gruttadaurio (607) 255-1792

#### ■ Grassland Field Day & Equip. Show, Aug. 12

Grassland Equip. Corp., Latham, NY, (518) 785-5841

### Texas bluegrass has possibilities

CROSSES BETWEEN TEXAS BLUEGRASS (*Poa arachnifera*) and Kentucky bluegrasses from the bluegrass program at Rutgers University have successfully withstood 100 degree temperatures. The tests may lead to some interesting new introductions.

### Buffalograss has limitations

RESEARCHERS LOOKING FOR A BETTER, low input turf have found several disappointing limitations to buffalograss. It cannot be used in shady areas, and it may be difficult to grow in areas where it does not occur naturally. Interested turf managers should contact their local extension agent to see if they are aware of any local test results, or simply plant a small test patch, and see for yourself how well it does in your area. ■

## Biotechnology

### The future of the turfgrass industry

by Dr. Eric B. Nelson



WHEN MOST PEOPLE hear the word "biotechnology", they immediately think of ivory-tower scientists tinkering in their laboratories, creating various types of genetically-altered mutant plants or animals capable of mass destruction and world conquest. This vision of biotechnology is perhaps the furthest from reality.

Over the past decade, opponents of these new biotechnologies have attempted to convince the public of their dangers, resorting to all kinds of scare tactics, and, in some cases, citing unusual examples of how some of these technologies could end human life as we know it. On the other hand, defenders of these biotechnologies (generally scientists like myself) have tried to convince the unenlightened and the ill-informed of the power by which various biotechnologies can benefit mankind by protecting our national agricultural enterprises and facilitating the clean-up of our polluted planet.

So what is biotechnology anyway? In the broadest sense, biotechnology is any form of applied biology, ranging from plant breeding and the use of microorganisms for the biological control of plant pests and diseases to biological waste treatment and the production of human medicines and industrial biochemicals. You probably are already familiar with several products of biotechnology. For example, the *Bacillus thuringiensis* or "BT" biological insecticides for use on turfgrasses and other agriculturally-important crops, are products of biotechnology. They are preparations of microorganisms that produce an insecticidal chemical. Likewise, the use of endophyte-infected ryegrasses and fescues resistant to a number of insect pests and diseases, are products of biotechnology. Additionally, the treatment of municipal solid wastes and waste water also relies on specific microorganisms to degrade pollutants and organic matter and aid in the purification of municipal water supplies. The latter is probably one of the older biotechnologies known.

Whereas the above-mentioned biotechnologies have provided novel and, in some cases, uniquely effective ways of dealing with agricultural and industrial problems, the biotechnologies with the greatest potential to change the way in which we approach plant production and plant protection are those based on developments in molecular biology—particularly in the field of plant and microbial genetics. Many of these advances have arisen from a discovery—nearly 20 years ago—that DNA (deoxyribonucleic acid), the basic genetic material within every living cell, could be transferred artificially to create new "hybrid" plants, animals, and microorganisms. DNA can be transferred from microorganisms to plants, from plants to microorganisms, microorganisms to



... with this technology, it is possible to introduce genes from a bacterium that encode the production of an insecticide into a plant.

animals, and so forth.

For the first time, tools are available to "engineer" living organisms with traits desirable for particular tasks or adaptations. For example, with this technology, it is possible to introduce genes from a bacterium that encode the production of an insecticide into a plant. These "transgenic" plants constitute the new wave of resistant varieties that will appear on the market in the next decade. Efforts are currently underway to develop turfgrass varieties resistant to a number of pests using recombinant DNA technologies.

Biological control of insects, diseases, weeds, and frost injury are all biotechnologies that are dependent on recombinant DNA techniques to engineer microorganisms for use as plant bio-protectants. One of the better-known biological control agents for the control of crown gall disease of stone fruits and roses is based on a genetically-engineered bacterium. Other preparations of microorganisms used for the biological control of plant pests are likely to be genetically altered in some way in the future.

What does all of this mean to you, as a turfgrass manager. First of all, it means that, in the 21st century, you will have to be more scientifically literate than in the past: our society will be based largely on advanced technologies, such as biotechnology. Second, it means that you should start developing an informed opinion about the pros and cons of the environmental risks of such technologies. There are many aspects of recombinant microorganisms and transgenic plants that we do not understand. However, if we compare transgenic plants with those bred by conventional means, it is readily apparent that we know even less about those bred by conventional means. No technology is without risk; however, you need to be informed about biotechnology and its inherent risk relative to other products or practices currently in use.

Finally, it is important to be aware of major developments in biotechnology, because it is likely that many of the products and practices used in the future will be based on developments in biotechnology. Many of the turfgrass varieties available for your use will be products of biotechnology, a number of fertilizers, fungicides, insecticides, and herbicides will be products of biotechnology. Many of the ways in which you dispose of pesticide and non-pesticide wastes will likely be based on various biotechnologies. The use of products and processes developed from biotechnologies is certainly the direction in which science, industry, and agriculture are moving. As the turfgrass industry evolves, many of these developments will gradually be adopted. We at *Turf Grass Trends* will try to keep you abreast of the latest developments in science and technology that affect the way in which you approach turfgrass management. The challenge for all of us will be to keep pace with this rapidly changing area. ■

### Benefits of reducing thatch in bluegrass turf



#### FIELD TIPS

Several years ago, in a test of fungicides for control of dollar spot on a disease prone turf, one of the treatments tested was not a chemical: it was a spring-time dethatching with a verticutter. One verticutting—without chemical control in the spring—reduced the incidence of Dollar Spot symptoms by 50% over the untreated control. Apparently, the verticutting disrupted the normal disease growth process and reduced the expression of symptoms.

### Cutting height impacts soil temperature

Cutting height has a significant effect on soil temperatures at a depth of 1". Raising the cutting height from 1.5" to 3.0" consistently lowers the soil temperature by 5%. The tests were conducted in Silver Spring, Maryland.

Short-cut turf has three months—July, August, and September—where soil temperature conditions are at the maximum for *M. poae*—the fungus that causes Summer Patch. Tall-cut turf has only two months—July and August—where the soil temperature is ideal for *M. poae*.

MONTH	CUTTING HEIGHT	AVERAGE SOIL TEMP.
July	1.5"	86°F (30°C)
	3"	83.3°F (28.5°C)
August	1.5"	84.2°F (29.0°C)
	3"	81.5°F (27.5°C)
September	1.5"	76.75°F (24.75°C)
	3"	74.3°F (23.5°C)

### COMING ATTRACTIONS

The next issue of *Turf Grass Trends* will feature in-depth articles on

- **Grubs** by Michael Villani
- **Foliar summer diseases** by Dr. Nelson
- **Biological & chemical control of broadleaf weeds** by Dr. Nelson
- **PLUS** our regular updates on the latest research findings, new products, regulatory actions, and timely tips on improving your turf management practices.

Subsequent issues will include articles on

- WETTING AGENTS AND WATERING
- SEEDS, SEEDING AND SOD
- SOIL TESTING, DORMANT FERTILIZERS AND SOIL AMENDMENTS
- TRAINING AND SEMINARS
- WINTERKILL