

Making Tradeoffs for the Better

by Brady Surrena

Fermenta Plant Protection Co.

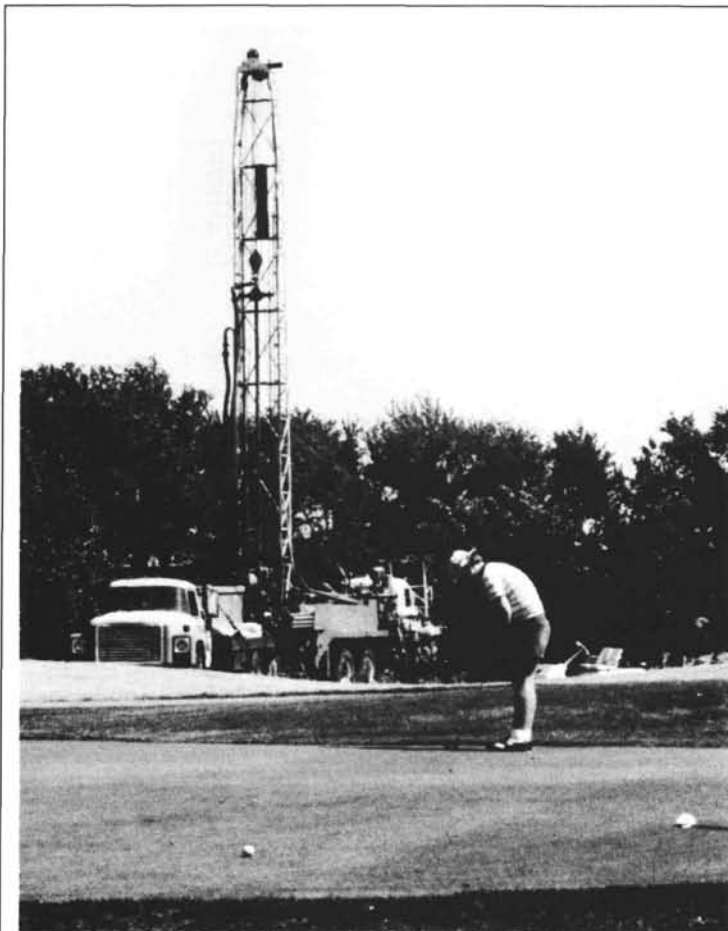
Man has been trying for centuries to alter his environment so it will suit his needs more effectively. This also applies to those of us dedicated to increasing the aesthetic and functional value of the turf. We accomplish this by mowing, fertilizing, irrigating, and applying pesticides in order to sustain a functional vegetative cover under totally unnatural conditions. We try to maintain monocultures of one or a few species when diversity is the rule of nature. The ecosystem is constantly trying to revert back to a natural state. We prevent this from happening through the use of modern chemicals. But some of these chemicals often cause further change in the already unnatural ecosystem.

We must be able to react to problems quickly, and to anticipate changes in the ecosystem resulting from our actions. Although evolution takes place with every change, the usage of certain pesticides and their effects on target as well as non-target organisms magnifies the occurrences of this normally subtle change in the ecosystem. Glaring examples of this exist when certain preemergent herbicides are applied to control grassy weeds. While the weeds are effectively controlled, the damage done to the root system of non-target or desirable fairway turf is unacceptable. Root inhibition of the desirable turf species removes their competitive edge and predisposes them to greater injury from disease and insects as well as encroachment from other weeds not controlled by the herbicides.

Interfering with nature's balance is also evident when long

lasting systemic fungicides are applied. Although it is very convenient to only spray once a month, the species specific nature of these fungicides not only eliminate a very narrow segment of harmful fungi, but also beneficial fungi that act as natural predators to help keep the entire fungus community in balance. Fungicides must be applied so as to maintain a balance that helps keep the beneficial soil microorganism at a constant level so they can aid in disease control.

Fungicides are very important tools in the high maintenance turf business. However, when planning a spray program, the effects of the various fungicides on the entire system and in particular, the beneficial non-target microorganism need to be considered. For example, Bayleton effectively eliminates a segment of harmful microorganisms, but constant use and high rates also eliminate beneficial fungus that help keep diseases in check. Diseases like brown patch, that are normally held in check are allowed to infect the turf unrestrained by beneficial microorganisms. Fungicides which are specific and long lasting are valuable if they are understood and used properly. Promising research has demonstrated that lower rates of systemic fungicides with broad spectrum contact fungicides will not only enhance disease control, encompassing many more diseases, but also reduce the adverse effect on beneficial organisms by not interrupting the system for an extended period of time. The tradeoff in this case is more frequent applications of systemic and contact tank mixes, but the benefits are a larger number of harmful microorganisms can be suppressed while at the same time allowing beneficial fungi to rebuild and perform their function before the next application. (cont'd. bottom of page 9)



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Upcoming Events — Mark Your Calendar

- July 21** — MAGCS monthly meeting at Palatine Hills
July 30-August 3 — Western Open at Butler National
August 6 — ILCA Field Day at Schroeder's Nursery, Grayslake
August 7 — Indiana Coalition for Environmental Concern at Indianapolis
August 7 — University of Illinois Turfgrass Field Day at Urbana
August 18 — MAGCS monthly meeting, Bartlett Hills
September 8 — MAGCS monthly meeting at Deer Creek G.C.
October 6 — MAGCS monthly meeting at Wilmette C.C.
November 10-12 — Penn State Turf Conference
December 9-11 — North Central Turfgrass Exposition
January 26-February 3 — GCSAA Conference in Phoenix

Len Berg, CGCS has been nominated to the GCSAA Board of Directors by the Chicagoland GCSA. Len feels that the GCSAA has to concern themselves in two areas: (1) membership growth and (2) media communications. He states that there are more than 14,000 golf courses in the U.S. and less than 25% of the golf course superintendents are members of GCSAA. He also feels greater need should be directed into media communication via television and newspapers.

The joint association meeting at Eagle Ridge in Galena was a success back in May. (It's a shame some items seem so late in reporting, but due to the deadlines of getting this newsletter out at times it just can't be helped). The ITF came away winners with receiving a Toro PGM III from Tri-State Turf and Beckworth Turf. Also donated was \$2,500.00 from Brayton Chemical, Dow Chemical and Union Carbide. The golf courses were beautiful and difficult. Bob Graunke and his staff did an excellent job as being hosts and making everyone feel at home and welcomed. What a beautiful place to work and live!

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Congratulations to Betsy & Tom Prichard on the birth of their second daughter, Katie Alexandra who arrived on June 2, 1986.

Bruce Williams reports that all of the speakers have been chosen for the NCTE in December.

Craig Marfia had the Crystal Lake course in excellent condition for the June meeting where there were 72 for golf and 80 plus for dinner. Craig has been having problems with his new installation of the watering system that he and his crew installed. It seems that an order of tees proved to be defective and he has had 13 of them crack and split on his this year. Nothing like coming out on a Sunday morning and find a new lake on the course.

If you don't have a CDGA handicap, get six scores into Ray Schmidt so he can get you a card. You need to tell him the course and the score.

Back to Back Holes in ONE!!!!!!

Brian Winkel, the technical sales representative for Cleary Corporation was playing the Tara Greens Executive Par Three course during a sales meeting in April and scored back to back HOLES IN ONE! Brian set a new course record with that accomplishment. Not too bad for a lefty.

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2	42	3	1	3	3
3	97	3	4	4	4
4	61	3	3	3	3
5	81	3	3	4	3
6	62	3	2	2	3
7	78	3	4	4	3
8	64	3	3	3	4
9	47	3	4	3	2
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 Attested: *Stewart*
 Date: 4/19/86 *duplicate card*

Roger Stewart was appointed by President Behrman to fill the vacancy on the Board of Directors with the resignation of Joe Williams at the June meeting. Welcome back, Roger!

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The Illinois Turfgrass Foundation Needs Our Support

With close to 300 members statewide the Illinois Turfgrass Foundation is a major source for research funding and dissemination of information concerning turfgrasses. The ITF is responsible for organizing and conducting the North Central Turfgrass Exposition which is fast becoming the best regional turfgrass conference in the midwest. The **Illinois Turfgrass Update**, mailed to the membership, is an informative publication with research updates from the University of Ill.

Funding in recent years has enabled the state of Illinois to add a Turfgrass Pathologist, Dr. Henry Wilkinson, to the staff at the University of Illinois. This is a direct result of money budgeted by the ITF and in cooperation with the CDGA and the Midwest Association of Golf Course Superintendents.

The annual dues for the ITF are \$65 with a minimum of \$25 earmarked for turfgrass research. Members receive a \$15 reduction in registering for the North Central Turfgrass Exposition.

The recent **Illinois Turfgrass Update** published a list of the current members of the ITF. It was surprising that of 300 members there were only 75 golf courses represented that were either members of the Chicagoland or Midwest Associations. Please consider supporting the ITF in the future. Put your dollars to work for turfgrass research in the state of Illinois.

Bruce R. Williams, CGCS

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“I.T.F. Golf Outing Nearly Set” “Evanston to Co-Host”

The Illinois Turfgrass Foundation has received word that Evanston Golf Club will be one of the two golf courses to host the 1986 Northern Illinois I.T.F. Golf Day. Arrangements are being worked out for ticket sales and promotion for the September 15th golf day. Our committee personnel include: Carl Hoppman, Don Spier, Mike Nass, John Turner, Fred Opperman, Dennis Wilson and Pete Leuzinger.

Watch for specific announcements in the August **Bull Sheet**. And please, Superintendents and your assistants, get registered handicaps for official entry for the first annual Dom Grotti Trophy.

The day will be informal, with plenty of food, refreshments, prizes, raffles and enthusiastic support for I.T.F. and research for turf in the State of Illinois.

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As everyone knows, in the first decades of the twentieth century it wasn't always easy to distinguish between professional, teacher, greenkeeper and architect and Joe Roseman was one of the unclassifiable pioneers who had something of all of these occupations in him. He eventually undertook the layout of several courses in the Chicago area. After a year at Racine he moved, in 1913, to Westmoreland — a club he was to serve in various capacities for the next eleven years. "It was at Westmoreland that I met him for the first time," recalls Herb Graffis. "He was one of the first men in the country to make course maintenance a business."

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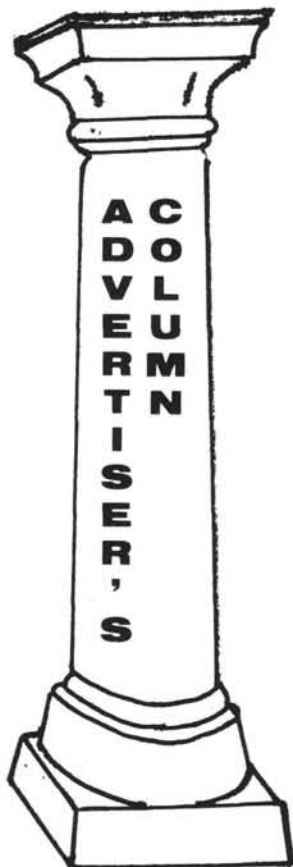
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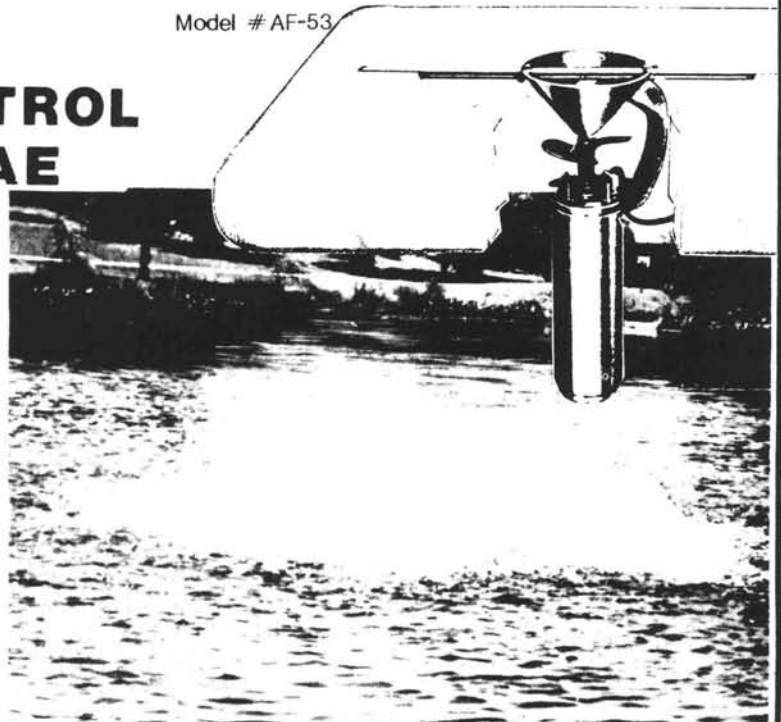
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Trees That Talk

The following article is reprinted with permission from the June 1985 issue of *The Potlatch Story*.

When trees talk to each other, they apparently don't just stand around idly shooting the breeze. There is growing scientific evidence that, far from being helpless giants, trees engage in active, organized warfare against ravenous insects and micro-organisms. When they communicate, their conversations invariably center on defensive strategy.

Such recent findings refute the deep-rooted belief that trees and other plants are passive beings. For centuries, man assumed that plants were at the mercy of Mother Nature and subject to the whims of the weather, predatory birds and parasites that served to limit the pest population. Although it is true that trees can't run away from their enemies, they aren't helpless victims of insects and other creatures that can freely munch away at them, either.

Field studies conducted at several universities reveal that trees have a kind of neighborhood alert system to warn each other of impending danger. Dr. David Rhoades, an organic chemist, and zoologist at the University of Washington in Seattle, was the first to present documented evidence that trees "talk."

"Plant communication was somewhat of a serendipitous discovery," Rhoades admits. "In the last 10 years or so, evidence has been building to support the observation that plants produce defensive chemicals in their leaves that increase in direct response to an insect infestation. In 1979, I was studying what happens to willow trees when attacked by tent caterpillars. What we started to find was that not only were attacked trees responding defensively, so were unattacked trees. We got the idea that some sort of communication was going on here and did addi-

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tional experiments."

In the initial study, Rhoades paired willow trees into two groups, one for experiment and another control group situated nearby. He infested the experimental trees with tent caterpillars and left the other willows alone. Two week later, he removed leaves from both the experimental and control trees and fed them to caterpillar larvae in the laboratory. As suspected, the larvae eating leaves from the test trees showed slower growth, indicating the leaves were emitting unappetizing chemicals. But to Rhoades' surprise, larvae dining on the unattacked control leaves developed more slowly, too.

Since the study was conducted with strictest controls, Rhoades wondered whether the attacked trees were somehow warning the neighboring willows to arm themselves by broadcasting monoterpenes, organic chemicals in a vapor state. Either that, Rhoades concluded, or the control trees were detecting pheromones, chemicals secreted by the caterpillars to attract other insects.

To confirm his theory, Rhoades repeated the study, only this time adding a third control group located several miles away from the test site. Again the larvae feeding on the leaves from both the test and nearby control trees grew at a retarded rate, while those fed leaves from the distant controls grew normally. It was obvious that the neighboring trees had mobilized their defenses.

Meanwhile scientists elsewhere were producing evidence that corroborated Rhoades' earlier findings.

At Dartmouth College in Hanover, New Hampshire, **Jack Schultz**, an entomologist, and **Ian Baldwin**, a biologist, have been working with sugar maple and poplar in a controlled, indoor environment. Instead of subjecting the trees to an insect attack, they mechanically ripped the leaves of test trees, leaving the control group in the same chamber and another control in another chamber unharmed. A later analysis of the leaves showed that the test group, along with the nearby controls, developed phenolics, noxious compounds disliked by insects. Leaves from the trees in the other room showed no change. Whatever communication went on appeared to be trunk-to-trunk and not through telepathy.

In an article in *Mosaic*, a journal of the National Science Foundation (March/April 1983), Schultz speculates that trees not only signal each other, but leaves on a single tree play a cunning strategy game with predators. Schultz says that by varying chemical compounds from leaf to leaf, trees engage the feeding insect in a deadly "shell game." The caterpillar is forced to roam about the tree trying to guess which leaves are nourishing and which are noxious, and in doing so, it becomes more conspicuous to hungry birds. The tactic also serves to hamper the development of the caterpillar since it can't comfortably browse in one spot.

Schultz also notes that caterpillars rarely eat a leaf entirely and wonders whether this half-finished meal is the result of a swift and unsavory chemical change in the leaf. Schultz has been conducting tests on these theories.

All these experiments are leading to the conclusion that trees aren't as defenseless as they appear. They have developed a sophisticated chemical arsenal that could make any worm buggly. Some trees give insects indigestion by clogging their systems with gluey tannins, lignins and phenols. At other times, trees concoct phoney amino acids to trick insects into eating defective protein that will stunt their growth. And hypersensitive plant cells have been shown to commit "sacrificial suicide" to set off the chain reaction that starts production of defensive chemicals.

This coordinated activity does not seem farfetched to Rhoades. "There's lots of visible synchronized behavior in plants," he says. "Plants often flower and fruit together. It makes sense that this synchronization involves some communication. It's possible they communicate about other things as well."

Rhoades also points out that synchronized fruiting may be a protective act, whereby the plants saturate the predator with goodies. While a few plants may succumb to the insect banquet, the group itself is able to survive.

One may ask, however, if plants are so smart, why do they fall prey to insect outbreaks? "It takes a while for plants to get it together to defend themselves," Rhoades explains. "Once they get organized, the insects usually move on." Rhoades speculates that trees appear to acquire short-term immunity from insect predators, such as spruce budworms and larch budmoths. Once the immunity wears off, the trees become vulnerable again to insect invasions. This possibly explains why regional insect outbreaks happen at regular intervals.

This research hold intriguing possibilities for forest management. "One practical application would be to turn the trees on before the outbreak so we can prevent damage," Rhoades says. "One way would be to release these defensive gases in trace quantities to **mobilize trees into action.**"

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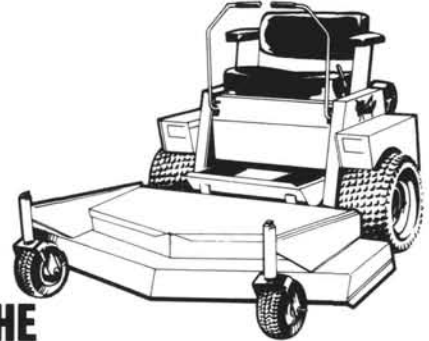
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- Healthy turf attracts more golfers and increases income

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