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OPTIMIZING PEST MANAGEMENT: "Strategies to Maximize Results"

By Monroe S. Miller

"Familiar faces talking about current topics" is a phrase appropriate for the 24th annual Wisconsin Golf Turf Symposium that was held October 25th and 26th in Milwaukee. Dr. Clint Hodges, Dr. Bob Shearman, Dr. Joe Troll and Jim Latham have addressed previous symposiums. New names added to the all-time roster of speakers were Dr. Mike Villani from Cornell University, Holman Griffin, Al Nees and Guy Auxer. This group, combined with session chairmen Mike Handrich, Marc Davison and Scott Schaller and WGCSA president Roger Bell, presented material that was extremely timely for the era we now work in. For those who weren't able to attend (or just didn't), our regrets.

As Roger Bell pointed out in his welcoming remarks, compliments were due to those attending when the weather was so nice because the symposium was where the serious golf course superintendent should be. Sometimes education must take precedence. Two other good points were made by Bell:

1. Meetings like the symposium help golf course superintendents to think and to plan rather than react;

2. Much of our work during the season is done alone. The symposium gives us a chance to mix with our colleagues.

Holman Griffin was an agronomist for the USGA Green Section for 15 years, so he is certainly familiar with our business. That experience is now complemented with a different kind of turfgrass management — that of the Richardson, Texas school district. It is a sensitive position to be in when pesticides are used — children, nervous teachers and administrators, and an occasionally unreasonable parent.

WGCSA president Roger Bell complimented the excellent attendance despite the beautiful autumn weather.

Griffin feels we are in serious danger of losing some of our best tools — pesticides. It's an unfortunate situation since many of them in their diluted condition are much less toxic than many household materials. "It seems one of our goals should be to get pesticides out of the amateur's hands," he said.

The training requirements and heavy regulatory hand have had their impact, however. It is hard to argue that pesticide use isn't safer today than 10 years ago. But more is needed. IPM should become more than just a vogue phrase; we need to make serious commitments to it. There is a place for research to develop products that will enhance pesticides and reduce the frequency of their use. Resistant turf species selection and development deserve even more attention. Biological controls need advancement. More education of field people is required so judgments made by them will be more accurate. "We need to get beyond the range of normal vision and capitalize on opportunities," Griffin emphasized.

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Holman Griffin, Mike Handrich and Mike Villani.

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Our involvement needs to span the financial, political and moral horizons. We have to generate some emotion for our side, according to him. Griffin feels there is no reason users of pesticides and the environmentalists cannot be compatible. We must be careful not to misuse or overuse pesticides; these actions stimulate an inordinate amount of emotion on the part of radical environmentalists.

"We must have the decisions affecting us based on facts and research, not emotion or extremism," he said.

Mike Villani's lecture on scarab grubs had some confused because of unfamiliarity with the word "scarab". We use the more generic and less precise word "white". Scarab grubs include the grub stage of Japanese beetles, the northern and southern masked chafer, the June beetle and the black turfgrass aetenius beetle.

The scarabs spend all of the damaging stages of their life cycle in the soil zone, and this makes them difficult to control. The damage they cause is done by the chewing and pruning of roots. These grubs also feed on nursery stock and potted plants.

Damage from scarabs is usually spotty because of their tendency to aggregate. Symptoms are due to the stress caused by reduced rooting systems resulting from grub feeding. Both characteristics are used by golf course superintendents to help determine if there is a grub problem on the golf course. Another way is to watch for the presence of adults, especially when they feed on ornamentals. Bird feeding is another clue of grub presence, as is the presence of predators like moles and skunks.

Villani feels that 90% of the time golf course superintendents overtreat grubs. The primary reason, he believes, is the lack of a good monitoring system.

These questions need to be answered before treating with a grub insecticide:

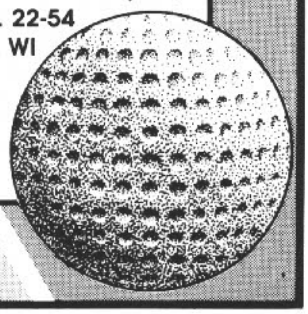
1. Is there a problem?
2. What is the problem?
3. Does the insecticide you are considering work on the problem?

Square foot samples and a soil profile inspection down several inches help answer these questions.

Mike developed a system last year for sampling a golf course from the first tee through the 18th green. It involves a number of people sampling at regular intervals and a person to "read" the samples. He is working on refinements to his system. Watch the literature for more on this.

The subject of unreliable effectiveness of insecticides was discussed by Villani. He pinned this uneven control on several things:

1. Product lag time caused by the time required to move the insecticide off the grass blades, through the thatch and into the soil where the scarabs are located. Also, this time varies among the various soil insecticides.
2. Insecticides can break down on foliage. This is especially true for more insoluble materials. If it isn't moved from the leaves, it will do nothing to control your grub problem.
3. Some materials experience breakdown from UV light and from heat.
4. Some materials break down quickly in the soil. Others are tied up in the thatch. They can be broken down and rendered useless by bacteria.
5. Soil pH and spray tank pH, especially greater than 7.0, can lead to a shortened period of activity.



6. Timing affects how controls work. The distribution of grubs in the soil will determine how effective a treatment is. For example, spring and fall are generally the best times to treat for grubs. Reason? The feeding stage numbers are highest then and the grubs are smaller and easier to kill. Also remember that ½" is about as far into the soil most insecticides will move.

7. Moisture content of the soil has a tremendous influence on insecticide efficacy. As a soil dries out, grubs go down into the soil profile and aren't accessible. Therefore, he recommends irrigating a turf before an insecticide application and immediately after (and heavily).

Bob Shearman gave the audience an excellent and sweeping review on turfgrass stress and pest interaction. Stress management requires an understanding of how one stress may predispose or exaggerate other stresses. The environment, the cultural systems in use, pests and intensity of use go toward determining what the ultimate turfgrass competition is.

Bob Shearman was back in Wisconsin from the University of Nebraska.

Many factors determine the competitive edge of one species over another, factors like nutrition, moisture levels and life cycle state.

Dr. Shearman made use of the terms "supraoptimal" and "suboptimal" in describing above and below normal conditions and how they lead to stress on turfgrass populations. His message, throughout his lecture was, "always, minimize the stress." This strategy will go far in maximizing pest control.

This was Clint Hodges' second trip from Ames, Iowa and Iowa State University to Milwaukee to participate in the symposium as a speaker. He expressed a liking for the smaller group in a "one room at a time" setting. Nice compliment for the symposium committee, this year's and the 23 previous!

Dr. Hodges deserves a compliment or two from us. The amount of data presented was impressive albeit overwhelming. He has an ability to distill the results and make a point on what value a specific table or graph might have to us. He also carried a big load in the 1989 symposium — he was on the program both days, a "first ever" if my memory serves me correctly.

One of the major lessons this golf course manager is left with after listening carefully to Hodges' paper on herbicide stress and leafspot development was how one discovery leads to another experiment which leads to another in yet a different direction. Anyone has to be impressed, also, with the interdisciplinary nature of the work of turfgrass investigators. Botany, organic chemistry, pathology, agronomy, et.al. Critical for a good investigation, obviously, is a keen sense and awareness of "what's happening here?"

His work, which demonstrates that herbicide applications can increase the incidence of leafspot, serves as a significant reminder that these compounds we use in managing golf turf are "biologically active compounds". We are applying them to plants, but fungi are also plants and demonstrate a reaction to herbicides also.

Dr. Hodges remarked that this discovery does not present a "crisis" situation, but one that dictates the use of common sense. If you traditionally have a leafspot problem, consider this when deciding on the date of an herbicide application.

He did not request and probably doesn't want it. But Guy Auxer, golf course superintendent from the Applewood Golf Course in Colorado, has my sympathy. He's a true pioneer in every sense of the word.

Guy's charge, as a result of a lease agreement between his employer (American Golf Corporation) and Applewood's owner, is to manage the golf course without pesticides. The lease agreement requires the aquifer be kept clean and pesticide free, that runoff must be reduced and fertilizer use lowered.

Guy Auxer accepts thanks from Marc Davison.

He's complied, and the results weren't very pleasing at times.

They've built a containment around the entire shop yard to eliminate any risk of a spill contaminating surrounding areas. Irrigated areas have been greatly reduced and reseeded to more drought tolerant grasses. Now, only greens, tees and landing areas receive irrigation water.

"No fungicides" means that, not even for pythium, pink snowmold or gray snowmold. Pink snowmold is controlled by removing all snow from the greens. It reduces disease incidence, but the greens suffer significant mechanical damage as well as desiccation.

More interesting than attempts to control snowmold has been the effort to reduce the number of damaging soil insects (grubs) in Applewood's greens. Guy welded sharpened slicer tines onto a shaft that fits the tine holder of a Ryan Greensaire. The machine was moved across the green hoping to physically kill or damage the grubs. Guy reported limited success.

I'm sure the thought going through the mind of every golf course superintendent in the hall was "I hope it doesn't come to this." That thought should insure rededicated efforts at maximizing pesticide efficiency. The option doesn't look that good.

A lot of us had anxiously awaited Dr. Hodges' lecture on sand green management. It was worth the wait. If there was any regret, it was that some of the golf players in Wisconsin who are incessant in their demand for faster greens every day weren't in the Pfister to hear what Clint Hodges has learned

in years of research studying putting green root zones.

In a general way, he has observed that many of the golf greens built with sand root zones present "oddball problems"; they aren't typical of those observed for decades on established greens. He was quick to add that the concept leading to sand root zones is a good one and is becoming more and more prevalent.

The first problem reviewed was one we've read a lot about in the past five or so years — the black layer. This phenomenon is not peculiar to sand greens; it occurred on older soil type greens years ago, but not to the extent it has on sandy greens. It isn't a "physical" layer, but rather a biological layer. It is commonly found ½" to 3" below the surface as a band ¼" to 1" in thickness. A distinctively bad odor is typical, and the layer feels greasy. The color is due to the presence of sulfate reducing bacteria, which are strict anaerobes. For them to exist, their environment must be oxygen free.

Dr. Hodges first investigated black layer problems in 1975, ten years before they hit nationwide. In that decade, he observed that whenever he found

Clint Hodges considers a question from the audience.

a black layer he also found bluegreen algae on the surface. These organisms produce a mucus on the surface which fills pore spaces in the sand medium below. The mucus cements sand particles together. That cementing action helps create anaerobic pockets, even without flooded conditions. The flooding was mentioned because Dr. Vargas at Michigan State has also studied the black layer problem extensively, but from an ' acute ' development angle; i.e., flooding or very wet conditions and high sulfur content.

These pockets are called microsites by Hodges. Activity starts at these places long before drainage through the profile stops or even slows. His lab studies indicated that without the presence of the bluegreen algae, there was no anaerobic bacterial development, and therefore, no black layer development.

Anticipating the question, "what kills the grass plant?", Dr. Hodges answered, "I don't know. None of us knows." He has put healthy plants into black test tubes and the tubes clear up! He has seen the layer in the field fade after aeriofication, decreased watering, etc. He has seen black layers fade on their own, with no change in management.

Other problems notable to sand greens that were discussed by Hodges were:

1. Pythium root dysfunction. Occurs only on sand greens, whether new or rebuilt ones. In fact, sometimes on rebuilding a chlorotic strip at the soil/sand — collar/green edge develops. The damage looks like pythium, but roots remain white. The disease moves

onto the green. After reseeding and establishment, the problem is gone forever. Although the body of research on sand microbiology is smaller and relates to marine biology of beaches and seashores, the theory explaining the problem makes sense.

The microbes in sand aren't as diverse nor are there as many as in soils. The pythium organism that causes damage in new sand root zones is present everywhere in soil, but it isn't competitive in them and remains in check. But in sand there is no competition, so they are able to "run the green". After reseeding, there has been a stabilization of competitive populations. Additionally, the pythium organism has weak reproductive ability. So the problem doesn't last very long.

2. Root growth in sand differs from root growth in soil. In soil, root diameter is constant and the turns in the roots are smooth. In sand, sharp turns are required to grow around individual particles of sand. Mechanical injury to the root results — actual cuts occur. This allows easy access for disease organisms.

3. Abrasive action of sand can be detrimental to turfgrass plants. Particles on the surface are loose and are grinding under foot traffic and machinery traffic. Sand topdressing adds to the constant cutting action of the sand.

4. Irrigation practices — excessive water — and surface sources can encourage algae species noted previously. They start mucus production and soon the green isn't draining properly.

These are merely highlights of Dr. Hodges' experience dealing with problems associated with sand greens. His advice: "The sand system is a great system, but we must better learn how to use it." He also commented that "90% of the problems (with sand greens) could be eliminated by raising the height of cut."

In his 30 year career at the University of Massachusetts — Amherst, Professor Joe Troll touched the lives of literally thousands of turfgrass students. Thanks to some friendly persuasion by one of his former students, Bob Belfield, Dr. Troll temporarily came out of retirement to address the symposium on a subject we hear little about — nematodes. Troll received his Ph.D. from the University of Rhode Island in nematology.

Joe Troll and Thursday session chairman Scott Schaller.

His extensive review of nematode research in laboratory settings, from the greenhouse and from the field led to these conclusions for golf turf managers:

1. Nematodes can debilitate turf, especially if it is under stress.

2. Damage is difficult to predict — sometimes high parasitic numbers exist with no damage to the turf. And sometimes damage results when parasitic nematode numbers are low.

3. Symptoms are those present whenever there is root damage to turfgrasses.

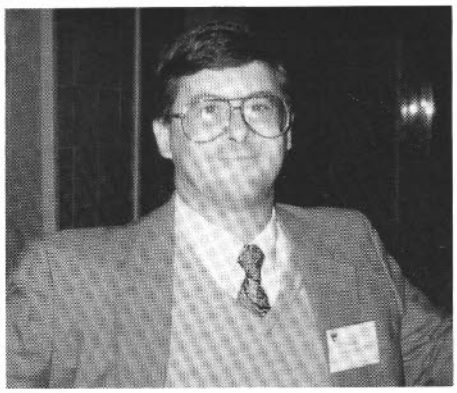
4. Some diseases occur with nematode damage.

5. To maximize treatment, be certain you have a nematode problem in the first place. Check with a trained nematologist.

6. If you need to use nematicides, use caution. Many are highly toxic.

"Golf course superintendents are under a lot of pressure from ever increasing costs, pesticide use regulations and environmental issues. The need for efficient pesticide applications has never been greater."

Al Nees centered his talk around the above statement and a factor that can drastically change the efficacy of pesticides we are using — pH. Because of the above factors in our working world of 1989, we need a minimum number of pesticide retreatments be-



MMSD's Al Nees.

cause of poor results. The pH factor is one that needs more consideration.

For example, Wisconsin is known for extremely hard water; typical pH values of water samples from around the state demonstrate this:

Location	pH
Madison	7.2-7.7
Appleton	9.2-9.3
Milwaukee	7.4-8.0
Wausau	7.3-8.3
Stevens Point	8.0-8.3
Green Bay	7.7-7.9

Surface waters in the midwest are usually alkaline. For example, Lake Winnebago pH values run from 8.7 to 8.9, the Wisconsin River varies between 7.0 and 7.5, and the Ohio River can run up to 9.5.

These pH values affect the half life of pesticides. Here is some data you may want to keep on file:

Material	pH	Half Life
Dylox	6.0	89 hours
	7.0	6.5 hours
	8.0	63 minutes
Sevin	6.0	100 days
	7.0	24 days
	8.0	3 days
	9.0	3 hours
	10.0	20 minutes
Orthene	7.0	46 days
	9.0	16 days
Turcam	7.0	10 days
	9.0	2 days
	10.0	10 minutes
Bayleton	Stable across broad range of pH values	
Rubigan	Stable across broad range of pH values	
Banner	Some loss of effectiveness at pH below 5.0	
Chipco 26019	6.0	20 days
	9.0	< 24 hours
Daconil 2787	Stable	
Banol	Stable	
Dyrene	Some loss of effectiveness at pH below 5.0	

Most herbicides are stable in alkaline conditions. At pH values less than 5.0, they may precipitate out and the herbicide is ineffective.

The above data suggest a pH meter or a test kit would be a good investment for a golf course.

Jim Lathan continues the "wrap-up" tradition.

Two features are common to every symposium. Foremost is the wrapup and review by our region's USGA Green Section Agronomist. Again, that was handled superbly by Jim Latham. We're fortunate to have such ready access to the man who has become one of the country's foremost turfgrass experts.

Keynote speaker Tom Sutton.

The luncheon each year features a keynote speaker of some note. This year, Tom Sutton from Channel 12 Sports in Milwaukee offered some insights to career in the world of sports. He's had the opportunity to deal with golf in his job and enjoys it tremendously. He encouraged golf course superintendents to communicate with media people like himself — they are always interested in good stories and newsworthy events. That kind of visibility can be a plus.

The 1989 Wisconsin Golf Turf Symposium tackled a subject that has quickly moved to the forefront in our business. The speakers who accepted invitations to build the program did an excellent job of helping answer some of the tough questions being asked.

Next year is the 25th anniversary of the symposium. Anything is possible now to mark this quarter century of education in memory of O.J. NOER. Jim Spindler and the symposium committee anxiously await suggestions for the 1990 program.

Sketches by *THE GRASS ROOTS* illustrator Gene Haas.

GCSAA BUILDING FOR THE FUTURE

By Rod Johnson

GCSAA, our national organization, is on a roll. Membership numbers, membership participation, and membership services have experienced unprecedented growth during the past five years. Membership in GCSAA continues to be the most positive step a golf course superintendent can take.

The spiraling growth cycle of GCSAA and the expanded services it provides is not without its growing pains. The Board of Directors of GCSAA has approved the construction of a new headquarters building. The GCSAA Headquarters will remain in Lawrence, Kansas.

Do we need a new headquarters building? Yes, definitely without question! Not for image, not because new is better, we need a new headquarters building to continue to function. The expanding GCSAA membership roll and the services that we, as members, have come to expect have made the construction of a new facility a requirement.

In 1973 GCSAA moved from rented space in Des Plains, Illinois to its present location in Lawrence, Kansas. A 9,600 square foot building was built on a 1.9 acre site on Alvamar Golf Club. Through the years this building has been expanded to 12,000 square feet. The present building and the site have been expanded to its physical limits. This, coupled with the fact the GCSAA growth shows no sign of leveling off, makes construction a necessity.

The figures depicting GCSAA growth are staggering. In 1983, 16 staff people handled the workload while today 42 people are needed. In 1983, GCSAA had revenues of 1.9 million dollars. 1989 will see GCSAA revenues top 6 million dollars. Five years ago there were 5,000 members of GCSA, now there are over 9,000. Education continues to be the hunger of GCSAA members. Six educational seminars were offered in 1983 and 72 in 1989. The merchandise program, virtually nonexistent five years ago, will gross more than $150,000 in 1989. The numbers go on and on. The growth is staggering, phenomenal and unprecedented.

With these overwhelming facts in mind, GCSAA Board of Directors hired an outside firm to study our group, where we are heading and what our future needs will be. Announcing the conclusion of the study was that we need to build for our present with the future in mind.

Hard facts in hand, GCSAA has purchased six acres in a research park west of Lawrence, Kansas. The three corner lots are part of a new development and will adjoin a golf course which is just beginning construction. The golf course is part of Alvamar Golf Club and is just down the road from our present headquarters. GCSAA has also purchased the option on the three adjoining lots bringing the total available land to 11 acres.

Plans have been prepared for a 40,000 square foot building. The building will be of four levels in two wings housing offices and classrooms. The plans show a very attractive design that includes a landscape befitting the profession. The floor plan that I have viewed is very functional, esthetically pleasing and included are exciting things beyond the norm. Space has been allotted for a visitors center, classrooms, and a state-of-the-art theater setting. Also included is a library and a board of directors room.

Do we need all of this? You bet! The tale of the tape is that when GCSAA

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