GV 975 .A1 P3 Jul-Aug 1989

# JULY/AUGUST 1989

# A PATCH our 64th Year A PATCH of of GREEN

TURFGRASS FIELD DAY M.S.U. – AUGUST 31, 1989



OFFICIAL PUBLICATION OF THE MICHIGAN & BORDER CITIES GOLF COURSE SUPERINTENDENTS ASSOCIATION



### RED THREAD A DISEASE ON THE I

by Dr. Noel Jackson University of Rhode Island Kingston, RI

SEP 1 8 1989

Dr. Jackson's update of the red thread disease situation featured the following points.

-Five years ago we thought we knew all there was to know about red thread. Not so!

-Turf of low vigor (similar to dollar spot) is susceptible, especially fine fescues (red fescues more than Chewings fescues) and perennial ryegrasses. Bermudagrass is susceptible to pink patch too. Ryegrass cultivars differ in susceptibility.

-Recent evidence indicates that more than one fungus is involved. Corticium has been studied in detail, but there are at least two fungi involved one causes red thread and one causes pink patch. The two diseases are similar and easily confused, one for the other. Often a disease complex - red thread/ pink patch — are considered as one disease.

-Infection starts usually at leaf tips as small spots develop. These spread down the leaf. Fungi have pink mycelia that are easy to see. Cool, wet weather favors the development of the fungus. Compact masses of fungi produce a resting stage which gets darker as it dries and becomes hard and brittle. Also, little cushions of mycelia are produced. There is a

fruiting stage that produces two to four spots. These germinate to produce more mycelia. Turf grown under low fertility is more prone to infection but even vigorously growing turf can become infected. At times the fungus may act like snow mold under snow cover in the winter.

-The fungus may work on living tissue as a parasite or on dead tissue as a saprophyte. Some symptoms differ; patches may not produce dark red thread-like mycelia. More than one fungus may be working together at the same time under some conditions. The fungus glues or mats the leaves together so the pink appearance is more conspicuous.

Pink patch fruits with only two spores. Mycelium is clamped and fluffs out in culture. Red thread produces less mycelia in culture and has a simple septa that is not clamped.

- -Control of the two fungi with chemicals varies -
- -cadmium good for both;
- -daconil good for red thread;
- -benomyl good for pink patch;
- -bayleton good for both:
- -chipco 26019 good for both.

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CAUTION

### **Brown Spots** -

### Where Are They Coming From?

Have you noticed any irregular brown areas that are unexplainable? Some superintendents have noticed that these spots are quite common - especially during insect season.

Some of us think this damage is caused by the aerosol cans containing insect repellents (See picture).

Notice the foot prints. We find these all over the course - tees, greens and fairways.

### **EDITOR's NOTE**

The articles appearing in the "A Patch of Green" do not necessarily reflect the views or opinions of the editors. We present articles for their informative value. It is up to each reader to evaluate the information presented.

#### **GOLF COURSE SERVICE PERSON**

Leading Irrigation Distributor has immediate opening for service person for repair work on golf course irrigation systems in S.E. Michigan. Some experience necessary. Call Pat (313) 588-2990 for interview.





Unexplained brown spots with green footprints in the middle.



Maybe an explanation - A person applying an insect repellent.

### THE INFLUENCE OF TURFGRASS THATCH ON PESTICIDE USAGE

#### By John Orick B.S. Degree Candidate - Purdue University

The application of pesticides is a necessary component of a turfgrass management program. Pesticides should be applied in a manner which will give maximum control of the problem pest and minimal danger to the plant, applicator, and environment. The thatch layer, a tighly intermingled layer of living and dead stems, leaves, and roots of turfgrass plants located at or near the soil surface (1) can affect the mobility, persistance, effectiveness, and potential plant injury of certain pesticides.

These effects depend on the type of pesticide, time of application, post-irrigation treatment, rate of application, and depth of pesticide residue in the soil profile. Therefore, it is important to understand the influence of the thatch layer on pesticide applications so that the adjustments in the management program can be made to increase the benefits or decrease the risks involved with the application. Pesticides are less mobile in the thatch layer than in the soil profile, which reduces the effectiveness of many pesticide application.

The use of preemergence herbicides for selective



control of annual grasses is an important step in turfgrass management. Preemergence herbicides prevent the seedling development of annual grasses by inhibiting cell division and root development (4). Preemergence herbicides used on turfgrasses are somewhat immobile in the soil due to their low water-solubility. According to a study conducted by Hurto et al. (4), in which five different preemergence herbicides were applied to Kentucky bluegrass stands with and withour thatch, the mobility of the herbicides through thatch is very similar to that of the soil. Pesticides in the upper thatch layers due to the porous structure of this portion of the thatch layer. However, the lower layers absorb more of the pesticide residues. This decrease in mobility in the lower layers is probably in response to the low watersolubility, amount of chemical available for movement, and increased adsorption capacity of the highly decomposed organic matter located in these layers. Weed control was good to excellent when preemergence herbicides were applied to Kentucky bluegrass stands with and without thatch, but Kentucky bluegrass showed more injury from herbicide treatments when thatch was present. This was caused by herbicide contact with roots and rhizomes as it moved through the upper layers of thatch. Therefore, the removal or incorporation of the thatch layer may decrease injury from applications of preemergence herbicides (4).

Nonselective postemergence herbicides are applied to kill the existing vegetation for renovation of turf. Paraquat, a nonselective herbicide, has shown to be inactivated by most fine-textured soils (3). However, inactivation of paraquat in organic soils is minimal due to the weak attraction of paraguat cations to the negatively charged organic soil particles. On the other hand, the residual activity of glyphosate (Round-up) in both mineral and organic soils is minimal. The effects of thatch on the activity and mobility of paraquat and glyphosate were shown in a study completed by Hurto et al. (3). The experiment set up consisted of Spring and Fall application of paraquat and glyphosate to kill Kentucky bluegrass with thatch and without thatch for the purpose of reseeding with perrenial ryegrass four days after the pesticide application. The percentage of ryegrass cover in the plots with thatch treated with 2.2 kg ai/ha (1.9 lb ai/A) of paraguat was much less than the percentage of ryegrass cover in plots treated with 1.1 kg ai/ha (0.97 lb ai/A) of paraquat and plots treated with glyphosate at 2.2 kg ai/ha (1.9 lb ai/A), 4.5 kg ai/A (4.0 lb ai/A), and 9.0 kg ai/ha (8.0 lb ai/A). The Fall application of paraguat suppressed percent germination at both rates. Vertical mowing CONTINUED PAGE 23

# SOIL FOR TURF FACILITIES

#### Dr. Gene C. Nutter, Agronomist

In the operation of modern turf-grass facilities, more problems are caused by improper physical condition of soil than probably any other single factor. While other symptoms may be more readily recognized and treated (such as disease, compaction, poor aeration, weeds or fertility problems), the real and underlying cause is usually poor soil physical conditions. It is time that we recognize this basic fact so that we can begin to cure the real problem and stop the neverending, expensive job of just treating the symptoms.

True, most superintendents and managers of turf facilities inherit their soil problems. How sad it is, however, to see the great number of new facilities (including expensive and complicated golf course greens) that still ignore the importance of proper soil conditions, including surface and internal drainage, soil preparation, and use of ammendments and soil conditioning. Certainly there is enough information available to guide the planners and contractors of these jobs in this age of technology.

Why, then, does our industry continue to make these inexcusable and expensive mistakes? As long as we continue to follow this course of extravagant ignorance, we will be burying our heads further in the sand instead of advancing our individual courses, our profession and our industry image.

What are the basic aspects of soil management that seem to be so often overlooked or ignored? First, let us consider the origin of soil.

#### SOIL ORIGIN

In its natural condition, soil is a complex mixture of mineral fragments, decayed plant residues and microscopic organisms. Each of these classes of ingredients have their influence on the nature of the soil. As a natural body, soil developed through a constantly changing pattern which was greatly dependent upon environmental conditions such as temperature, rainfall, plant life and location.



For the majority of cases, the native soil is most influenced by the mineral fraction (called parent mineral). These soils are called mineral soils. Parent material may have devloped from underlying rock formation, or been transported by ice (glacial soils) or water. Thus, soils which developed from rocks through the age-long process of weathering will have properties akin to those kinds of rocks. Examples are the heavier, more complex mineral soils such as clays. Usually these soils are more difficult to manage physically (poor internal drainage and aeration) but are richer in fertility potential (will hold more nutrients).

On the other hand, soils which were laid down from water deposits - such as sands - would reflect a lighter, simpler structure. These soils (such as our various Florida sands) are easier to manage physically (better drainage and aeration) but have much lower fertility capacity.

Then there are organic soils, derived from decayed plant residues. These are the muck solid of the rich Everglades region, and the peat deposits around the state.

#### NATIVE vs. ARTIFICIAL SOILS

If we were farmers, we would be growing crops on one of the types of native soils mentioned above. We would gather information about the nature of our particular soil from state and federal soil scientists who had surveyed, studied, classified and mapped the major soil formuation in every county in Florida (and likewise most other states). This information would provide guidelines as to the physical condition and fertility status of our particular soil, and this information would guide our crop production practices.

However, turf managers are not farmers and, with few exceptions (sod producers, perhaps), they are not CONTINUED PAGE 22





### 1989

# MICHIGAN STATE UNIVERSITY TURFGRASS FIELD DAY

where:

Corner of Mt. Hope and Farm Lane Rds. East Lansing, Michigan

> when: Thursday, August 31, 1989 8:30 am - 5:00 pm

> > what:

Turfgrass Research On Lawn Care and Golf Course Topics, Pig Roast Lunch, Trade and Equipment Show and Auction

who:

Anyone With an Interest in Turfgrass Management - You!

AUCTION DONATIONS: We need equipment to be donated to the auction. All proceeds go to the Michigan Turfgrass Foundation to help support turfgrass research, teaching, and extension programs at MSU. If you have any items you would like to donate please fill out the form below and drop it in the mail. Send to: Kurt Kraly, Auction Coordinator, Wilkie Turf Equipment Division, Inc. 1050 Opdyke Rd., P.O. Box 749 Pontiac, MI 48056.

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### Indianwood Golf & Country Club - A Gem In The Rough

Indianwood hosted the 1928 Michigan Open and the 1930 Western Open (then considered one of the Majors, before Augusta became a Major), also Michigan PGA Championship in 1948 and 1949 with such names as Walter Hagen, Tommy Armour, Al Watrous, Clarence Gamber, Ed Fergol, Horton Smith, president of PGA in the early 50's, bringing much attention to the Club and to the State of Michigan.

The Michigan Open returned to Indianwood for many years and produced winners that became great names in golf. Its rugged personality required great golf - reminiscent of the Scottish golf courses and the demand they put on all aspects of ones game.

Stan Aldridge purchased the club in the early 80's and returned the golf course to its former greatness, restoring much of the old traditional appeal and adding many new bunkers and tees along with well planned cart paths to help keep the unfriendly golf cars out of the rough. Indianwood always was a good golf course - but now it is a great golf course.

### 44th Women's Open Championship

#### JULY 13-16, 1989 INDIANWOOD GOLF & COUNTRY CLUB

Betsy King birdied 4 of the first 7 holes during her last round to pull away from the field to win the 1989 Women's Open at Indianwood.

Betsy said she liked the fast greens and that she would like to see fast greens on all tour events. In her opinion, the greens at Indianwood were the fastest surfaces the LPGA players had played in six months.

Mark Jackson, green superintendent at Indianwood, and his qualified staff were able to produce speeds in excess of 10 feet on the stimpmeter. They were a little faster than anticipated so when questioned about the speed he said they were "around 9 feet 16 inches" — a clever way to say 10'4" — I'll have to remember that one.

Mark has a great staff of superintendents working for him at Indianwood. His "Old Course" superintendent is Dennis Ingram, CGCS, who joined the staff this spring, coming from South Carolina; a graduate of Stockbridge. Ed Powers, an Ohio State grad, is the superintendent of the "New Course". Ed joined the staff early on, during the "grow-in" period of the new course.

Their two able assistants are Tim Dorner and Doug Berzack, both MSU graduates.



So what does this make Mark Jackson? The General Superintendent? or the Golf Course Manager?

Whatever his title, he is great. We should all be proud of the work that Mark did for Indianwood and what he has done for our profession.

### **MICHIGAN RANKS #1 NATIONALLY**

In a recent survey by the National Golf Foundation it was determined that Michigan has more Daily Fee Golf Courses than any other state - 489.

It ranks fifth nationally in the total number of golf courses - 721. States with more courses are Florida (932), California (836), New York (794) and Texas (761). The state of Ohio is ranked sixth with 703 golf courses.

Michigan only has 146 private clubs, which ranks it eleventh well behind others that have 300 to 400.



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# SUPERINTENDENTS IN THE NEWS

Michigan Green Superintendents are in golfing news almost weekly and the news is being spread nationally by the media - the news is all good.

The season started out in April with a great article in the April issue of **Golf Course News** on superintendent Clem Wolfrom written by Vern Putney.

Clem was featured in a column titled "Super Focus". His history in the various activities involving golf were highlighted. Among these activities were his dedication to the Michigan Turfgrass Foundation, to the Michigan & Border Cities GCSA and to his club — the Detroit Golf Club.

His recent energetic rebuilding of the North Course greens was covered in the story. Besides the green rebuilding project, he replaced all the sand in the bunkers after correcting deficiencies and he regrassed all the fairways. As if this wasn't enough, he even corrected a few tees that needed attention. All in all, you can see why Clem Wolfrom is considered the "Dean" of the superintendents in Michigan.

Ron Brandon, CGCS of Warwick Hills Country Club, Flint, Michigan hosted the 25th Annual Buick Open. As expected the course was in immaculate condition. This has become the Pro's favorite tour stop because the playing conditions are perfect and they are able to better control the ball, producing great rounds. This year's tournament was especially exciting with Leonard Thompson the eventual champ, beating out two opponents who were in contention until the 17th hole. Then Hall Sutton four-putted 17 and Payne Stewart faltered on 18.

Harry Schuemann, CGCS at Grand Rapids Elks Club hosted the annual tour stop for the Seniors. This event is sponsored by the Jaycees and it too has become a great stop for the Seniors because of the superb conditions.

The tournament was played the same week as the Women's Open, taking some of the glory away from the Senior event.

On Monday, July 31 Bill Madigan, CGCS at the Country Club of Jackson, Jackson, Michigan was interviewed by J.P. McCarthy of WJR Radio about the magnificent condition of the Club for the annual ProAm being held that day for a local hospital charity. The sponsor was using the upcoming Michigan International Speedway event to draw celebrities from the world of racing combined with stars from golf.



## SPEAKING OUT

By Orion Samuelson Vice-President Agricultural Services Director WGN Radio - Chicago

Memo to the people on this planet who insist on a totally risk-free world. . . it just isn't going to happen. As much as we think we all like that possibility, it isn't in the cards. Some people, though, apparently think it can be done and are willing to sacrifice the rights of others to get it. Let's just reflect on some of the media stories in 1989 alone.

The Alar apple story. . . it was back in 1985 that questions were raised about Alar, a chemical used on apples to keep them from dropping before they ripen and to enhance their color. The tests were never considered conclusive, but growers decided if there were any doubts, they would remove the product from use. Four years later, a TV show decided to expose this "terrible risk" and neglected to tell the entire story. Result?. . . near panic among customers, particularly parents of little children who consume a great deal of apple juice. After schools removed apples from lunchroom menus and Washington state apple growers saw their out-of-state shipments drop 10 percent in two weeks, government agencies and health organizations finnaly convinced a lot of people that apples are safe to eat. It was pointed out that to match the level of Alar fed to laboratory animals in the tests, a human would have to eat 58,000 pounds of apples a day!

The aflatoxin story. . . that was the front page story which left the impression that cancer was your ultimate destiny if you ate corn chips, corn flakes or any meat, milk or eggs produced by corn-eating animals. Again, corn producers, government agricultural and health agencies had to scurry to reassure our consumers. Exporters had to convince foreign buyers that our inspection system keeps aflatoxin levels well below minimum allowable levels, and U.S. corn is safe to buy. The newspaper neglected to say this was an old story that was thoroughly covered during last year's drought and in light of precautions taken, certainly didn't merit this much attention now.

Then there were two cyanide-tainted grapes in a

CONTINUED PAGE 17



ANOTHER GREAT QUOTE ABOUT CENTURY GOLF TEAM!



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#### SPEAKING OUT, CONT.

shipload from Chile, our primary source of fresh grapes in the winter season. That resulted in the virtual shutdown of Chile's primary source of foreign exchange and caused economic hardship for wholesalers and retailers in this country. What if we had never found those two grapes?... the world probably would have continued as before.

Then there are the almost daily stories condemning the use of chemicals and fertilizers in food production and the treatment of farm animals. Since it is the food producer that ultimately suffers the economic losses of all these "scares," it becomes imperative for individuals and organizations in agriculture to take the offensive in educating the consuming public. . . telling them that you as producers do have a "special interest" but it is twofold. . . making sure the food you produce for your own dinner table is safe and wholesome, and at the same time, being able to use the tools of technology to make sure there is ample production to take care of a growing world population.

Again, the world is not and will not be "risk-free." As the bumper sticker says, "Living can be dangerous to your health!" However, if everything we eat is so poisoned and unwholesome, why does life expectancy in our country continue to increase?

From Farm Forum

The United States Golf Association has accepted an invitation from Crystal Downs Country Club in Frankfort, Michigan, to be the host for the 1991 U.S. Seniors Amateur Championship. The dates of the 37th Championship are September 16-21. (The U.S.G.A. Senior Open is at Oakland Hills Country Club in July, 1991.)

Club in July, 1991.) The 1991 Senior Amateur at Crystal Downs represents the third USGA championship scheduled to be played in Michigan, following the 1989 U.S. Women's Open at Indianwood Golf and Country Club in Birmingham. It will be the 22nd USGA competition, but was only the second Senior Amateur in Michigan. The 1984 Senior Amateur was held at Birmingham Country Club. Cyrstal Downs Country Club was designed by Dr. Alister MacKenzie, with assistance from Perry Maxwell and opened in 1927.

November 28-30, 1989 — Turfgrass and Ornamental Chemical Seminar, Purdue University. And, January 22-24, 1990 — Midwest Regional Turf Conference — Adams Mark Hotel, Indianapolis, Indiana. Contact: Jeff Lefton, (317) 494-9737.

November 13-15, 1989 — Penn State Golf Turf Conference — Contact Dr. Joseph Duich, (814) 865-9853 or Pennsylvania Turfgrass Council, (814) 355-8010.

January 10-12, 1990 — Eastern PA Turf Confernce & Trade Show, and, February 20-22, 1990 — Western PA Turf Conference & Trade Show — Contact Dr. Thomas Watschke (814) 863-1613, or PTC (814) 355-8010.



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Bill was selected for the 1989 Turf Master Award presented by the Grounds Maintenance magazine.





left, JIM BRANDT, CGCS, Past President of GCSAA, most recent winner of Distinguished Service Award. center, CHESTER MENDENHALL, oldest living Past President of GCSAA (1948).

right, SHERWOOD MOORE, CGCS, winner of the 1989 LEO FESER AWARD, also past president of GCSAA.



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### COLLEGE STARTS 2-YEAR DEGREE IN EQUIPMENT MANAGEMENT

Abraham Baldwin Agricultural College in Tifton, Georgia, is now accepting applicants for a two-year program in turf equipment management leading to an associate of applied science degree in agricultural engineering technology.

The curriculum will be designed to train equipment managers at golf courses, parks, landscaping firms, city recreational programs and rental companies.

Students must complete 30 credit hours in English, speech, mathematics and history, 35 credit hours in mechanics, 15 credit hours in turf management, 10 elective credits and one 15-credit summer internship.

The mechanics courses include principles of engines, power unit testing and diagnosis, turfgrass equipment, metal technology, principles of hydraulics, hydraulic testing and recreational equipment.

Turf management courses include grounds maintenance equipment, turfgrass identification, golf course design and management and principles of horticulture.

"We require that students take courses in English, speech and history," says Dr. Jerry Davis, associate professor of agricultural engineering and coordinator of the TEM program. "An employer can be assured that one of our graduates is both technically competent and possesses the communications skills that are necessary for success in today's workplace."

So far as is known, ABAC is the first institution to offer a degree program in turf equipment mechanics. Horry-Georgetown Technical College in Conway, South Carolina and Lake City (Florida) Community College offer one-year certificate programs.

For more information, contact Davis at ABAC, P.O. Box 8, ABAC Station, Tifton, Georgia 31794; phone (912) 386-3255.

. . .

The Associated Landscape Contractors of America has produced a series of videotapes on training employees to operate basic landscape equipment.

The tapes cover equipment familiarization, safety precautions, machinery operation, equipment capacity and maintenance, injury prevention and accident prevention for six types of equipment: trim mower, mid mower, power edger, stringtrimmer/ brushcutter, power hedgetrimmer and backpack power blower. The programs come with reference guides and a retention test.

For more information, contact the ALCA at 405 N. Washington St., Suite 104, Fall Church, Virginia 22046; phone (703) 241-4004.

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#### SOIL FOR TURF, CONT.

growing turf on natural or native soils. Instead, they are managing turf facilities which were built by a mass mixing of soil, through excavation, fill, grading and leveling processes. For example, housing projects, apartment complexes, golf courses, athletic fields and highway sites have gone through mass movement of "dirt". When finally completed, there usually is no resemblance between the resultant "dirt pile" and the original native soils that occurred on that same site.

What does this mean to us practically? It means simply that you have to throw the "book out the window" and start over. None of the previously compiled information of soil scientists applies. It could be that the orginal soil was improved (richer soil hauled in), but usually it works the other way. Often, damaging foreign material is mixed in (debris, chemical deposits, etc.)

Another serious problem is that the mixing process was not uniform and therefore there is much greater variability in the final soil material. This is why we find "spotty" conditions in our turf from area to area. The grass is reflecting the "spotty" soil conditions underlying. In short, all of these factors mean that turf soils are more dufficult to manage!

Where do we go from here? Good turf managers have learned the vital importance of proper soil conditions to the success of grass production and maintenance. Therefore, the problem is simple. By carefully studying and evaluating the soils you inherit, you can then go about an intelligent soil management program. For intensively managed turf areas (such as putting greens, tees, athletic fields, etc.) you may need to improve that inherited "dirt pile" by the use of soil ammendments. We know generally, for example, that heavy, mucky soils can be improved by the addition of coarse sands; or that infertile, ball bearing sands may become more productive by the addition of heavier soil fractions like clay or organic matter such as peat.

#### SOIL AMENDED TO IMPROVE PHYSICAL CONDITION

But just a minute! What really are we doing when we add the above soil ammendments (and many others - natural, processed or manufactured)? First and most importantly, we are changing the physical condition of the soil.

The management of turf facilities imposes unique and damaging requirements on the turf. Heavy traffic, continuous wear, regular movement of maintenance equipment, high rates of irrigation - all these factors work to destroy soil structure. Thus, turf soils must be constructed (remember - no more natural soil, so we must construct a usable soil base from that inherited "dirt pile") to take the punishment and still grow good turf.

Here is where the soil ammendments come into change the inherited soil to a more desirable physical condition. Briefly, to produce good turf under our demanding condition, soils must have proper pore space. There must be pores to move water through CONTINUED PAGE 25



#### THE INFLUENCE, CONT.

and core aerification improved the percentage of cover in the paraquat-treated plots containing thatch. This mixing of soil and thatch enabled the paraquat to move from the weak adsorption sites of the thatch to the stronger adsorption sites of the soil. Glyphosate caused no significant decrease of germination due to the moderate adsorption to soil and thatch exchange sites and harmless effects on plant roots. Therefore, percent cover can be increased in paraquat-treated plots when Spring-applied, herbicide rate is reduced, or soil incorporation is performed following the application (3).

The use of insecticides is essential to the management of most turfgrass stands. Thatch influences the effectiveness of insecticides through adsorption and degradation of the insecticide within the thatch layer (2). The effects of thatch and irrigation frequency on the degradation of diazinon was shown by the research of Branham et al. (2). Radiolabeled diazinon was applied to thatch and thatch-free Kentucky bluegrass plots irrigated at two frequencies. Leaching, volitilization, and metabolism of diazinon were measured once a week for three weeks. During the second and third weeks more pesticide was lost from thatchy turfgrass and loss accelerated with increased irrigation frequency. Degradation, measured by the release of carbon dioxcide, was the main cause for diazinon loss. Leaching accounted for very little of the loss of diazinon regardless of the presence of thatch. Ninety-six percent of the diazinon residues were located in the 0-10mm zone of samples containing thatch. Overall, the effectiveness of diazinon to control insects in Kentucky bluegrass with thatch was less than that of Kentucky bluegrass without a significate thatch layer. This reduction of insecticide effectiveness was caused by increased binding by thatch and increased irrigation, which allowed for chemical hydrolysis of the pesticide (2).

A mid-August application of isofenphos (Oftenol) to golf courses and home lawns may provide good control of scarabaeid larvae. However, a decrease in control has been seen in some cases. Niemczyk et al. (5) examined the degradation of isofenphos on four Ohio golf courses where the control of scarabeid larvae failed. Soil and thatch samples were taken from each of the four sites previously treated with isofenphos and an untreated site, mixed thoroughly with distilled water, and allowed to settle-out overnight. Isofenphos was added to the floating liquid from each sample, centrifuged to separate liquid from solid, and then analyzed. Three days after adding isofenphos to the samples, greater than 90% of the isofenphos was lost from samples taken from sites that had been previously treated with Oftanol. It is thought that microorganisms within the thatch laver adapt to the presence of the pesticide and utilize it as a food source. It has also been found that 97 % of the pesticide residues remain in the thatch layer. Therefore, due to the concentration of residues and microorganisms residing within the thatch layer, CONTINUED NEXT PAGE

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#### THE INFLUENCE, CONT.

degradation was increased in this zone (5).

Insecticides in general are not mobile within the thatch layer as shown by Niemczyk et al. (6). Five insecticides were applied to an Ohio golf course fairway with 0.75 in. of thatch. Measurements of insecticide residues were taken at 2, 5, 15, 29, 57, and 91 days after treatment. The 2, 15, and 29 day measurements showed 97 % of the insecticide residues still present within the thatch layer regardless of irrigation applied after treatment. Throughout the study never more than 0.4 ppm were found below the 1.0 inch soil level. Three years later, Niemczyk applied Triumph 4E, Triumph 2G, Otanol 2G, and Mocap 10G to 3.1m x 3.7m plots on the same golf course fairway. He once again found a 97 % recovery of the pesticide residues within the thatch layer under the same conditions and rates. Therefore, they concluded from the data that these five insecticides were quite persistant within the thatch layer of turfgrass (6).

The application of isazofos (Triumph) is recommended for the control of soil-inhabiting insects. Irrigation is advised to increase the effectiveness of isazofos. The value of this post-treatment irrigation after the application of isazofos was demonstrated in the research conducted by Niemczyk et al. (7). In this study the persistance of isazofos was measured within the first and second 2.5cm of the soil profile. Measurements were taken at 3 hours, 3 days, 1, 2, 3, 8, and 36 weeks after treatment on irrigated and unirrigated sites. Over 90% of the residues remained in the thatch layer. The residues were higher in the irrigated samples due to the washing of the insecticide from the leaves to the thatch. Contact by soil-inhabiting insects in the thatch layer was the major source of lethal dose. Therefore, post-treatment irrigation improves the control of thatch/soil inhabiting insects by moving the insecticide into the thatch layer.

The influences of turfgrass thatch on pesticide performance are:

1) Increased degradation of the pesticide.

2) Enhanced potential injury to the turfgrass plants.

3) Reduced control of soil-inhabiting insect pests.

4) Inhibited germination of turfgrass with the use of paraquat in turfgrass renovation.

These effects can be altered by modifying the pesticide choice, application timing, treatment rate, or irrigation practices after the application. However, due to the persistance of pesticide residues within the thatch layer or incorporation of soil and thatch provides the most effective improvement in pest control. Therefore, regular core aerification or vertical mowing are the most efficient adjustment that can be made to a turfgrass management program to improve the effectiveness of a pesticide application.

John Orick is a senior at Purdue University majoring in Turfgrass Science. Most of his turf-related experience has been with golf course, four years at a public course in his hometown of New Palestine, Indiana,





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Credit: Indiana Superintendents News,

Indiana GCSA, June, 1989.

SOIL FOR TURF, CONT.

the soil and pores to move air so the grass can "breathe". Approximately half of the soil is made up of solids (the mineral matter plus a small amount of organic matter). The other half is pore space.

Pore space is of two kinds - large (macro) pores and small (micro) pores. Air moves into the soil (and harmful gases move out) through the large pores, except after a heavy rain or irrigation. Then they may be filled with water temporarily, which soon drains out. This is the ventilation system which aerates the soil. The large pores should comprise about half of the total pore space.

Small pores (also called capillary pores) move water through the soil. These pores conduct water to the grass roots (not the opposite - roots don't "grow to water" - water must be there first) from the water table, like a kerosene "hurricane" lamp moves kerosene up through the wick. The finer the pores, the farther the water will move, and the slower.

If we are fortunate enough to take over the turf facility prior to planting, we have a golden opportunity to shape our future soil condition. If we inherit an established facility, the job is more difficult, expensive and time consuming. It can be done gradually, however, by periodically working proper ammendments into the soil as topdressing following soil aeration.

The proper proportion of amendments can be determined by a soil testing procedure known as "mechanical analysis". Many soil testing laboratories and industrial firms can provide these tests, and will help you compound or construct a soil to meet your needs based on such factors as percolation rates, etc.

Once you have amended your soil to a proper physical condition, then the previously mentioned secondary symptoms such as compaction, weeds, restricted roots, etc. will be minimized. Then turf maintenance will be more enjoyable and successful business.

Credit: "The Bonnie Greenward"

#### **TURFGRASS FOUNDATION NEWS**

24th Annual Golf Tournament, the premier fundraiser for Turf Research is to be held at Oakland Hills Country Club, October 2, 1989.

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