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Miscellaneous Contact Fungicides (Protective)

Two contact fungicides which do not fall into the above chemical groups are anilazine (Dyrene) and chlorothalonil (Daconil 2787). Both are broad spectrum, protective leaf fungicides. Anilazine is quickly and strongly absorbed by fungal spores present on the leaf and then inhibits a variety of spore functions. Chlorothalonil, which is also an algicide, does have more specific mechanisms of action. It reacts with glutathione to disrupt regulation of cell functions and it also inhibits sulfur-dependent enzymes in the cell.

Ergosterol Biosynthesis Inhibiting (EBI) Fungicides (Systemic; Curative and Protective)

Metalaxyl controls *Pythium* by inhibiting RNA synthesis, an essential process for cell growth. The sensitive fungal stages are mycelia and spore production. It does not inhibit spore germination, zoospore release or plant penetration by the fungus.

Therefore, metalaxyl primarily inhibits growth of fungal mycelia after plant penetration. In other words, it is killing the mycelia already inside the plant and mycelia that enter the plant. This is why metalaxyl is often mixed with contact, protective fungicides such as mancozeb (Fore). The mancozeb inhibits spore germination and initial penetration by Pythium on the leaf surface but does not effect fungal growth within the leaves; the metalaxyl will eradicate mycelia which has penetrated the plant surface. Because metalaxyl is both systemic and persistent, most of the disease control achieved from the mixture is from metalaxyl but the mancozeb provides an additional measure of control.

Fosetyl-A1 (Aliette) is also systemically active against Pythium diseases - Pythium Blight and Pythium Root Rot. It is a unique systemic fungicide because it moves both in xylem and phloem. Therefore, foliarly applied fosetyl-A1 will move down to the roots to protect against Pythium Root Rot. The other systemic fungicides

that have been discussed are not translocated in the phloem. If they are to protect plant roots, they must be absorbed by the roots.

Fosetyl-A1 has weak curative activity of *Pythium* but is excellent at protecting new plant growth. Like metalaxyl, it inhibits mycelia and spore production. How fosetyl-Al controls *Pythium* is not entirely clear, yet. It is known that fosetyl-A1 is degraded in the plant tissue to phosphoric acid and it is this latter compound which produces the antifungal activity, either directly on the fungus or indirectly by triggering defense reactions of the plant.

SUMMARY

Fungicides have been and will continue to be a major component of an integrated disease control program. As indicated in this article, there is a wide variety of chemicals available for turfgrass disease control. Knowing how to select fungicides based on their general activity and location of that activity will allow you to be a better manager of golf course turfgrass.

Table 1.	Turfgrass	fungicides	registered	in Florida.
ruoic 1.	I WILLEIMOO	1 mil Siciaco	registered	III T TOTTOTO

		General Fungicide Group					Disease Control			
Common Name of		Location			Action					
Fungicide	Contact L	ocal-System	ic Systemic	Protective	Curative	Brown Patch	Dollar Spot	Helminthosporium	Pythium	
Anilazine	+			+		+	+	+	_	
Benomyl	_	_	+	+	+	+	+			
Chloroneb	+	_	_	+					+	
Chlorothalonil	+	_		+		+	+	+	_	
Ethazol	+	_	_	+		_	_		+	
Fosetyl-A1			+	+	+	_	_		+	
Fenarimol	_	_	+	+	+	+	+		_	
Iprodione	+	_	_	+		+	+	+	_	
Maneb	+	_		+		+	+	+	_	
Mancozeb	+			+		+	+	+	_	
Metalaxyl		_	+	+	+	_	_		+	
PCNB	+	_	_	+		+			_	
Propamocarb	_	+		+			_		+	
Propiconazol	_		+	+	+	+	+	+		
Thiophanate Methyl			+	+	+	+	+	BOULE HE	_	
Thiram	+			+		+	+		_	
Triadimefon			+	+	+	+	+		-	
Vinclozolin	+	_		+			+	+	_	
Zineb	+	94_		+		_		+	_	

Fungicide Tips From Dr. Couch

by MARK JARRELL

N May, those in attendance at the joint meeting of the Palm Beach and South Florida Superintendent Associations were given a special treat in the form of a presentation by the leading turfgrass pathologist in the world, Dr. Houston B. Couch.

Dr. Couch, Professor of Plant Pathology at Virginia Tech and author of "Diseases of Turfgrasses", shared vital information concerning the proper use of fungicides. His dynamic and fact-filled presentation left many of us feeling a little ignorant, and disappointed that more time hadn't been available for his talk.

His admirable efforts to cover so much ground in so little time caused some confusion of facts with us slower-witted types, so I wrote to Dr. Couch requesting a synopsis of the information he had tried to convey. He responded quickly and generously with a copy of the complete report and permission to use it as we saw

What follows is the most useful information for Superintendents from Dr. Couch's field research program which was initiated at Virginia Tech in 1977.

- Granular vs. Spray Formulations
 - 1.) Granular formulations of nonsystemic fungicides require 2 to 3 times the active ingredient level of spray formulations to produce the same degree of disease control.
 - 2.) Granular formulations of nonsystemic fungicides require a longer time to bring the target

- diseases under control, and they hold their established levels of control for a shorter period than the same active ingredients as spray formulations.
- 3.) There can be a significant difference in efficiency of disease control among various granular fungicide product lines of the same active ingredient.
- 4.) Application of granular fungicides to wet leaves improves their disease control effectiveness.
- 5.) Watering immediately after the application of granular fungicides reduces their effectiveness in disease control. The extent of this reduction can vary among the various product lines.
- 6.) Mowing and collecting clippings immediately after the application of granular fungicides reduces their effectiveness in disease control. The extent of this reduction can vary extensively among the various product lines.
- Optimum Dilution Rates and Flat Fan Nozzle Tip Size
 - 1.) With each of 6 fungicides tested, optimum disease control was consistently achieved with the T-8002 tip.
 - 2.) The optimum dilution levels for maximum disease control for the tested fungicides were asfollows:

Dilution/1,000 sq. ft. Fungicide Daconil 2787 1 gallon

Dyrene 1-2 gallons Bayleton 2 gallons Chipco 26019 0.5-4 gallons

Banner 2 gallons Vorlan 1-2 gallons

III. Optimum Nozzle Types and Nozzle Pressure

- 1.) For greens spraying, Dr. Couch's "pick of the litter" is flat fan T-8002 or T-8004 tips at 30-60 psi at the nozzle.
- 2.) With the exception of Dyrene, the Raindrop RA-10 and RA-15 swirl chamber nozzles at 30 psi nozzle pressure work just as well as the flat fan nozzles. Dr. Couch feels the ideal setup is fair-way spraying with the Raindrop nozzles (there are fewer skips from a bouncing boom and their delivery rate is much higher) and then changing to flat fans for the
- 3.) It is critical to space the Raindrop nozzles on the boom to provide for a 100% overlap (whereas with the flat fan, a 30-60% overlap is adequate).
- 1.) Do not use flood jet nozzles for application of fungicides.
- IV. Effect of Post-Spray Rainfall or Irrigation on Fungicide Effectiveness
 - 1.) If leaf washing from rainfall or irrigation occurs before the spray dries on the leaves, non-systemic fungicides are rendered completely ineffective in disease control. However, once these sprays have



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- dried on the leaves, the leaf washing will not alter their disease control effectiveness.
- 2.) Systemic fungicides are not as vulnerable as the non-systemics to reduction in disease control effectiveness by rainfall or irrigation before the spray dries on the leaves. However, there can be a significant difference among systemic fungicides with respect to the degree of reduction in disease control efficiency brought on by leaf washing before the spray dries. For example, control of dollar spot by Rubigan was reduced 50% by leaf washing, but the effectiveness of Bayleton was not reduced.
- 3.) If the fungicide formulation contains an effective sticking agent, either rainfall or irrigation immediately after the spray dries on the leaves will not appreciably reduce the material's initial disease control effectiveness.
- 4.) The basic effectiveness of a turfgrass fungicide is established by the initial amount of water used in the spray formulation. Once the material has dried on the

- leaves, it can not be dislodged or redistributed on the plant by sprinkler irrigation or rainfall.
- V. Effect of pH of the Mixture and In-Tank Storage Time on the Stability of Turfgrass Fungicides

The pH of the spray solution can have a significant effect on the performance of certain pesticides. In the alkaline range, some fungicides undergo hydrolysis, which is an irreversible chemical reaction in which the hydroxyl ions in the water interact with the pesticide in such a manner as to break it down into a different compound.

In instances where a fungicide itself is stable under alkaline conditions, there is still the possibility of the makeup of the formulation itself becoming altered. Among the fungicides used on turf, Actidione, Dyrene, and Daconil 2787 will hydrolize to varying degrees if the spray is alkaline.

 The initial preparations of Chipco 26019, Vorlan, Banner, and Bayleton are tank stable in the pH 3.5 - pH 9.5 range. Also, storage for a period of 24 hours at these pH levels apparently does not alter the disease control effectiveness.

- 2.) If Daconil 2787 is allowed to stand for 20 hours before being used regardless of the pH of the solution, it will lose a significant amount of its fungicidal properties.
- 3.) Dyrene is alkaline sensitive. It should be prepared in a solution between pH 3.5 and 6.5 and used immediately. If it stays in the tank for 20 hours before use, a major reduction in disease control effectiveness occurs at both acid and alkaline pH levels.
- 4.) If Rubigan is used at the time it is prepared, pH does not affect its disease control effectivenss. It will retain its effectiveness for 24 hours at pH ranges from 6.5 to 9.5, but will lose a significant amount of disease control potential if allowed to stand 24 hours at pH 3.5

Dr. Couch's final advice for us in Florida was to do our best to keep Monica Juncke, our turfgrass pathologist in Ft. Lauderdale, busy and happy. She joins a select group of only 5 fulltime pathologists working strictly on turfgrass problems on the North American continent.

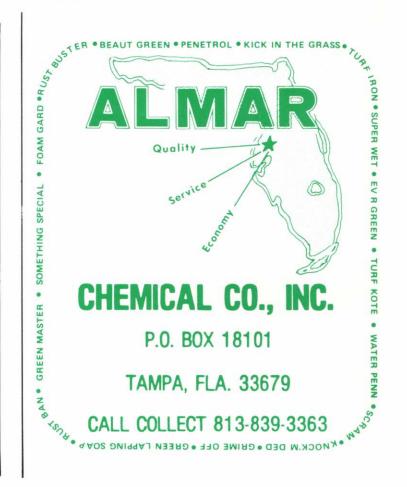


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Pest Control and the Superintendent

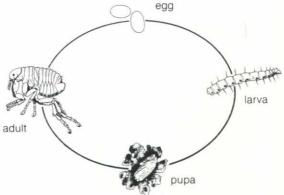
by RUSS MITCHELL Woodbury Chemical Co.

T has been brought to my attention, that as we are always discussing mole crickets and nematodes, that there are other things that can be helpful to superintendents in their never ending responsibilities around the golf course.

SPIDER CONTROL

How often are you required to do pest control in and around the clubhouse, restrooms or under the eves of buildings where cobwebs are unsightly and a nuisance. Of the several good products on the market the wettable powders are the formulation of choice. The reason is the residual will be much greater. You should get at least 30 days from these products. FICAM W will give excellent results. It is a carbamate with no odor and is easy to handle. Also the new pyrethiods like CYNOFF AND DEMON are excellent choices also. Their active ingredient is cypermethrin. They give long residual with quick knockdown. There is is a new chemical available in this family also called TEMPO. Its active ingredient is cyfluthren. It should work equally as well. This product is interesting because it also has pending turf labeling for mole crickets and is currently labeled for ornamentals.

Always remember to clean out your sprayer before using WP formulations if EC solutions have been previously used. The oil in the EC will cause the WP to ball up in the tank causing you to spray mostly water or clog up your spray tips when the lumps of concentrate stick in the tip.



Fleas have a 4 stage life cycle which consists of the egg, larva, pupa and adult stages.

These products are also labeled for ants, roaches, etc. and give excellent results. They are labeled for both inside and outdoor use.

FLEAS

Whether in the superintendents office or in the clubhouse fleas can be a real problem. One point to make is that I recommend that you use a professional pest control company to do the clubhouse because of their experience and also to protect you from liability due to a carpet stain. Having said this I also realize that this matter falls within the responsibility of a number of supers. If so here is the way to get good indoor control. First remember that if we are talking about an office and there is a dog that comes and goes you will never get 100% control. Having said this there are prodeuts that work well. The two products of choice by professionals are Safrotin and Dursban L.O.

Also Ficam W is labeled. It has one drawback as being a wettable powder, the residual is greatly reduced if the carpet is vacuumed because the product will be sucked up. The other products are EC. formulations so vacuuming is not a problem. Safrotin is a restricted use pesticide. This should be no problem since all golf courses use some restricted products now such as NEMECUR. Both Safrotin and L.O. are effective if properly applied. This sounds simple but with flea treatments it is crucial that the proper amount of chemical contacts the carpet. For example if the chemical to be applied has been diluted properly then the important thing is to see how many square feet one gallon is to cover. If it states one gallon per 1500 square feet then one gallon will not treat a 5000 square foot clubhouse. You may make it go that far but do not blame the chemical for lack of control. A B&G sprayer is the best choice for application to carpets. Its fan tip is perfect for the proper spray pattern. If your office is where the problem is and you do not wish to invest \$132.00 for a sprayer there are also excellent total release aerosols available. These can be purchased with a growth regulator in them which will give quick kill due to their dual mixture of a contact killing chemical and hormone. The most available of these is the Precor Plus fogger. This is a professional product. One can covers 6000 cubic feet and gives 120 day control.

Precor can also be purchased in liquid



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E. R. JAHNA IND., INC. LAKE WALES, FLA 33859-0840 (813) 676-9431 form to be mixed with Safrotin or L.O. This is the ideal way to manage your flea problem. After your first application of both residual and growth regulator you can follow up every 90 days with just Precor alone and never have a problem again because proper control of the adults with your initial spray application will allow the growth regulator to prevent new eggs from completing their life cycle.

ROACH CONTROL

Roaches can be a problem in your maintainance buildings, locker rooms, and of course in the clubhouse kitchen. Once again I recommend that you hire a professional pest control company for the clubhouse and kitchen area but I realize that some of you have this responsibility. Demon, Safrotin, Cynoff, Tempo, Ficam Plus, Baygon, and Dursban all give good control. Here again placement and type of formulation are the key factors in gaining good control. If you can get away with a powder residue the wettable powders will always give the longest residual. If large roaches are a problem coming in from outdoors you must treat the entry points. Doors, windows, and attics are the

main treatment sites. If your clubhouse has a dropped ceiling this is a key area to place a product like a Baygon or Dursban roachbait. This is very effective since the large roaches are coming in foraging for food. Also treat the mulched and land-scapped areas around the clubhouse since this is the major breeding ground for these pests.

If your problem is with german roaches, the small types that are found in kitchens, you have to treat in a totally different manner. These roaches will be very close to their food and water source. They do not like direct light and prefer to feed in the dark. If you see many german roaches in the open and in the daytime you can rest assured that you have quite a severe problem as the roaches are so plentiful that they are competing with each other for food and the weaker roaches are having to feed in this unfriendly environment.

They prefer to stay in cracks at all times other than feeding. That is why most roach control attempts on germans are just that, attempts. Baseboard sprays will do nothing for german roach control. Placement of any of these chemicals in the

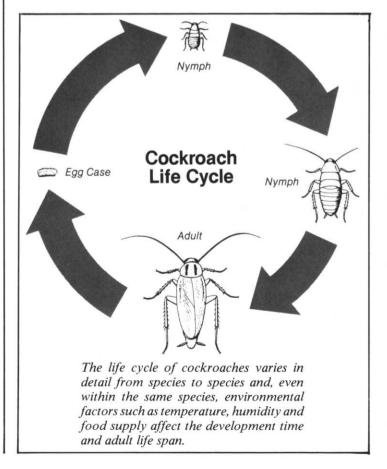
cracks and crevices will give good control. The synthetic pyrethoid insecticides will also give good flushing action and a quick knockdown. Reapply every 30 days or as necessary.

FLIES

Flies in the maintenance building can be a serious nuisance in the summer. The rains drive the flies inside and several species do inflict a nasty bite. Control is best achieved by using baits. The best are Flytek and Stimukil. Both contain a sex attractant (muscamone) and a toxicant. The attractant draws the fly to the bait and then the fly feeds on the sugar based granule. The bait contains the toxicant Methemyl. This is a very effective bait either wet or dry so do not throw it away when humidity makes it damp. Tests have shown that the bait works better when damp.

WITH ALL THE PRODUCTS LISTED PLEASE READ THE LABEL CAREFULLY AND FOLLOW IT TO THE LETTER. THIS IS FOR MAXIMUM EFFECTIVENESS AND YOUR SAFETY.









The Feet That Move the Crow

by GEORGE and CHARLOTTE JONES Wellington Golf Club

hen we walked inside the pretty Grand Cypress Golf Club, we came upon a lady sitting behind the table that had all the prizes for the Browfoot Open. We introduced ourselves and found the lady to be Vilma Kamphaus, the Crowfoot Open's Secretary. She was waiting for the tournament to end and share in the excitement of giving out the prizes to the winners. After talking to her for a few moments, we thought she was so interesting, that we asked if she wouldn't mind being interviewed for the magazine. At first she wanted us to talk to the executive committee members. She thought they might have a lot more to tell us. We explained we would like to have a little input from behind the scenes of the Crowfoot Open. Vilma and her husband Larry have worked on the Crowfoot Open for many years. Larry is the Committee Chairman.

The first question we asked Vilma was: How did you get personally involved with



Grand Express Trolley

the Crowfoot Open?

Vilma: I was volunteered quite a few years ago to help stuff envelopes with the towels and handouts that were given to each one in the tournament. I thought the towels could have been a little better quality than they were. I mentioned having a friend that did

monogramming and asked the committee if I could look into getting a classier towel to monogram. I got the OK to call my friend and got prices for the next year. They turned out beautiful. The same friend also found some promotional things and we were able to give out some nice gifts with the Crowfoot logo on them.

Trolley

Clang, clang went the trolley. Ding, ding went its bell as it crossed streets and cart paths on a scenic seven mile round-trip track at the Grand Cypress Resort in Orlando, Florida. This is one of the modes of transportation we took while we were there for the Crowfoot Open.

When we stepped inside the trolley, it gave us a feeling of turn-of-the-century transportation in the early nineteen hundreds.

We discovered the eighty year old trollies were purchased by Grand Cypress in 1983 from Brussels, Belgium. They were restored with attention to detail inside and out by Belgian craftsmen. Some of the traditional European designs are its tulip bulb lighting, leather hanging straps, light oak paneling, and cane seats. It runs electrically by overhead wire and pole slide.

The trollies have an interesting history. They were used in Brussels for more than six decades. During World War I they collected and distributed laundry, transported food and served as ambulances.

It's quite unique for guests at Grand Cypress to climb aboard the trolley for a leisurely ride to their destination on the property. Conductors in authentic style uniforms are helpful and courteous. They talk fondly of the trolley they operate.

For a few moments we held the memory of a bygone era. It all added grace and elegance that's ideally suited to the quality of lifestyle at Grand Cypress Resort.

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Distributed by: South Florida Turf Products, Inc. • Jupiter, Florida 1-800-432-2214 Southeastern Turf Grass Supply • Jacksonville, Florida 1-800-342-2066 F.G.: When did you become the Crowfoot Open Secretary?

Vilma: When Larry became chairman of the committee, I'd take his phone calls at home. Helping him little by little just got me involved. The committee asked me to come aboard and help them handle everything and to help keep things organized. It's grown from there. I've been the secretary for six years now.

Larry teases me about knowing everyone in town. I've lived in the Orlando area all my life. And I know a lot of people here. It got so funny because for a while when Larry would mention something like needing a printer for brochures, I'd say, 'I went to school with someone that's a printer.' Whenever he mentioned needing to get something done, I'd know someone that could help. One time when Arnold Palmer was in town advertising for Toro, Larry came home and informed me he was going to have lunch with Arnold and Ken Melrose. the President of Toro. I said to Larry, 'I went to school with Ken Melrose!' Larry quipped back at me, "No way, this guy is up there in Minneapolis! Now I'm tired of hearing that.' So I pulled out my old high school year book and showed him Ken's picture. Then I said, 'When you have lunch with Ken Melrose, ask him if he knows me!' When Larry came home, he laughed and said to me, 'You did it again! Ken did go to school with you!'

I did get to see Ken at the Bay Hill Classic in the Toro tent. We had a good time talking about old friends and remembering our school days.

F.G.: Do you spend a lot of time getting everything organized?

Vilma: Yes, it takes time to get it all together. The committee has the hardest job making the contacts and raising the funds needed. I'm on the phone a lot and I do a lot of running errands and picking up things.

This has been great for me. Most of the work is done in the Summer. That's when I have time to get a majority of it accomplished. I'm a Remedial Math Teacher at St. Johns Vianney Catholic School. It's a private school. My job is to bring students up to grade level, like a tutor. The school is affiliated with the church Larry and I were married in twenty-one years ago.

Besides taking up my time it also takes up space in our garage! That's where everything is stored. The sponsor boards, the big crow and things we use each year. After ten years Larry bought me a new car (he likes to drive the wheels off of them before he buys a new one). My beautiful new car sits in the driveway because there is no room for it in the garage!

Our whole family is involved with the Crowfoot Open. Our two sons and daughter help us. I guess you could call it a family affair.

F.G.: We notice<u>d</u> your son taking pictures during the tournament.

Vilma: Our oldest son Larry is very interested in photography and takes pictures for us. He is a senior in high school and has been a yearbook photographer for three years.

His high school, Dr. Phillips High, did a motion picture. This is a first for any high school. They wrote, produced and directed a movie. The people from Unviersal Studios volunteered a man to come to the school and train a student on operating the big movie camera. Our Larry was the student picked for the training. Now he is an assistant camera man and helps film commercials with them. He is going to continue studying this on through college. We are thrilled with this opportunity that came his way.

F.G.: How do you like working with a committee of seven men?

Vilma: This committee of guys are the nicest people to work with. They are all low-key and easy going. They are all fine gentlemen. We all work as a team getting it together.

F.G.: Your husband Larry has been with the Disney organization for a long time.

Vilma: Larry is going on his 18th year at Disney. Those first years were rough. he dug holes and planted trees along the boulevard where all the hotels are. He helped build the golf course and worked his way to the top.

When we celebrate his 20th year with Disney, we get free health insurance for life. Isn't that a great benefit!

Vilma Kamphaus does all the running and piecing things together that the committee members don't have the time to do. She mentioned many times during our talk, "The guys on the committee have the hardest job to do. I help fill in the spaces like all secretaries do."

We thanked Vilma for the interview. It's rare you hear of someone that is born, raised, married and still lives in the same town in Florida! Vilma is truly a Southern Bell. She is a genuinely warm and gracious lady.

There are a lot of feet that move the Crowfoot Open counting Vilma's, the committee members and everyone else involved. You can compare it to running a race. At then end of the race, they are all winners. They gave us a superb 1988 Crowfoot Open. That was their ultimate goal. ■



1988 Crowfoot Committee members: (seated) Vilma Kamphaus; (l to r) Gary Morgan, Tom Alex, Steve Wright, Joe Ondo, Larry Kamphaus, Jim Ellison, Bob Williams.