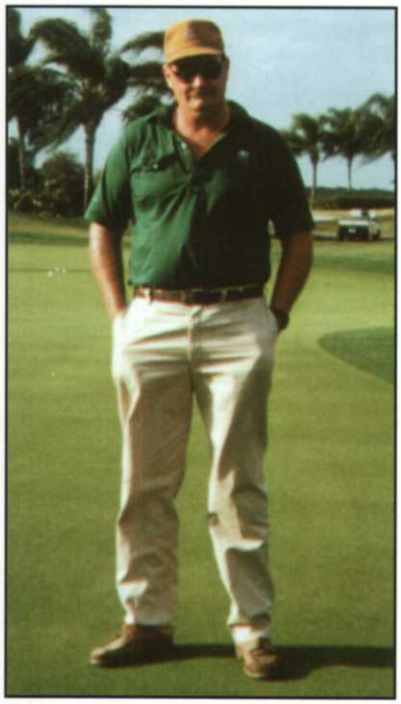
Royal Caribbean Classic

Links of Key Biscayne

Superintendent Mark Richards checks green while preparing for tournament.



The Intellinet Challenge

The Vineyards, Naples

Superintendent Pete Metcalf, photo left.

GTE Suncoast Classic

TPC of Cheval Tampa Bay, Tampa

Superintendent Chuck Green (above left) and Assistant GCS Scott MacEwen check green with a stimpmeter.

greens a week before the tournament, most of the praise was about how great they putted. J.C. Snead, who won in a playoff against Raymond Floyd, gave special thanks to the golf course superintendent. The announcers on ESPN also gave rave reviews of the course condition all weekend.

One of the superintendent's worries during the tournament came in keeping a watchful eye on all the service companies that came out to set up tents for all the social events. On Wednesday night after the first day of the Pro-Am, one of the companies was setting up patio tables and hammered an umbrella stand down through a 3" irrigation line and an 8" main line.

Mark and his crew began digging out around the pipes at 7 p.m. and, due to the proximity of the 8-inch main, it was dug mostly by hand. They had to cap the 8-inch to finish the watering cycle that evening, and everyone called it a night around 2 a.m. They left the 8-inch capped until after the tournament was finished.

Mark said he relied on his previous experience, as well as the support of others. He would like to thank Steve Kuhn, Monica Elliott, Bill McKee and Chuck Gast for all their help. He also said he would like to pass on thanks to some vendors for their contributions, including Florida Superior Sand, Kilpatrick Turf, Liquid Ag, Du Cor Chemical, Atlantic Fertilizer, and Hector Turf.

Once again, congratulations go out to Mark Richards for a job well done

Kelly Cragen, GCS
Biltmore GC, Coral Gables

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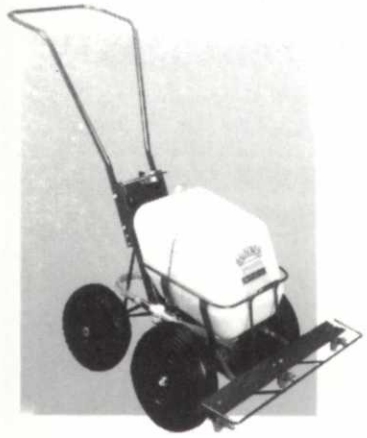

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The Intellinet Challenge

The Vineyards, Naples Florida

Superintendent: ***Pete Metcalf***

Every superintendent will face the challenge of preparing for a tournament. For most of us, it is the Member-Guest or Club Championship. Pete Metcalf, however, prepares his golf course for some of the greatest golfers of all time. When February rolls around in Naples and the likes of Raymond Floyd, Lee Trevino and Arnold Palmer come to town, you can bet that the Vineyards will be ready.

I talked with Pete shortly after the tournament and he informed me of the extremely rigid standards set forth by the Senior PGA Tour. As a veteran of five Senior PGA events, Pete has learned what he can and cannot do before the tournament. Even summer programs are timed to reduce any possibility of inferior playing conditions in February.

About eight weeks prior to the tournament, Pete begins to bring his golf course to a new level. Actually, he brings his course up to a new standard of excellence and a lower level of cut. Mowing heights begin to move downward for greens, tees, fairways and upward for roughs.

Greens are lightly top-dressed and lowered gradually to 1/8-inch, which gives them 9.5-10.0 roll on the stimpmeter. This year the greens were overseeded with Cobra bentgrass and Sabre, Poa trivialis blend and as usual they were perfect. Tees and fairways were mowed at 3/8-inch and were firm and fast for the pros. I was very surprised to hear that members played right up to tournament time. In fact, I think Pete even had some "walk-ons" during the tournament.

Because the Vineyards is a 36-hole club, Pete had adequate staff to prepare for the tournament, but he did admit that he paid just a little more attention to the south course.

Pete has an outstanding staff at the Vineyards. His assistants, Jim Vajen, Ron Boettger and Kyle Nygard, constantly remind crew members their goal was perfection. When a man the size of Pete Metcalf exclaims that there will be no tolerance of mental mistakes, you can bet the farm that there won't be. When the tournament is over, I am sure each and every crew member will be proud to be part of another great tournament at the Vineyards.

This year was no exception. The course was in great condition. Unfortunately, bad weather shortened the event to thirty-six holes. But from the winner, Bob Murphy, to the very last place man in the field not a negative comment was heard. Although tournament conditions cannot be maintained year round, maybe some of us can hold our own little championships and try to be like my hero, Pete Metcalf.

Wayne Kappauf, CGCS
Island CC, Marco Island

GTE Suncoast Classic

TPC of Cheval Tampa Bay, Tampa, Florida

Superintendent: ***Chuck Green***

Chuck Green arrived at TPC Cheval just in time to get the course ready for the Senior PGA Tour qualifying school, the qualifying finals and the GTE Suncoast Classic all back-to-back. He credits his Assistant, Scott McEwen for working a "trillion hours" to make it all successful. Little did Chuck know that Central Florida's "one week of winter" was just about to happen.

The Senior Tour officials requested a green speed of 9.5 on Cheval's severely undulating putting surfaces. To achieve this, Chuck began mowing ten days before the event, twice daily, with walking mowers with verti-groomers set 1/32 below the bedknife. During the tournament the greens were double cut in the morning and evening to keep the speed consistent.

Five days before the tournament, that "week of winter" I mentioned earlier, arrived. The course suffered two frosty mornings and a six hour freeze. The turf went off-color. Fortunately, the temperatures bounced back rapidly and the turf responded to be in great shape for the competition. No rabbits out of the hat, no cards up the sleeve, no smoke, no mirrors. Just patience in dealing with Mother Nature and having faith in your programs.

Yes, faith and a full staff of 20 people who worked two shifts daily. Starting each day at 3:30 a.m. and working till 9-10 a.m. Then back again at 3 p.m. till midnight. Everybody worked a 7 day week and put in 80-100 hours. Chuck also said that the loaner equipment he had available was a must for the success of the operation. The only problem encountered was with the night work. One operator misjudged the distance of an oncoming vehicle in the glare of the headlight and turned into some curbing and damaged a reel. That's one of the pitfalls facing any operation that has to rely on lights to get work done for special events or dawn tee times.

The weather turned out great for the event. The galleries were estimated at nearly 200,000 for the week ranking the tournament in the top three in attendance.

In fact, crowd control was a concern to Chuck as curious onlookers strayed into areas that were being mowed in the afternoons. But the crowds also saw Dave Stockton Sr. fire a nine under score to win the event. No time to rest for Chuck. He's on his way south to grow in a new TPC course. Former Central Florida superintendent, Steve Sorrell, returns from South Carolina to take over TPC Cheval.

Joel D. Jackson, CGCS
Disney's Magnolia GC

Plots with better turfgrass quality were treated preventatively with either mancozeb (Dithane T/O or Fore) or chlorothalnil (daconil 2787) fungicides at 14-day intervals.

Management of blue-green algae on putting greens

MONICA ELLIOTT AND MARCUS PREVATTE
UNIVERSITY OF FLORIDA
FORT LAUDERDALE RESEARCH AND EDUCATION CENTER

The two most common types of terrestrial algae are green algae, often called true algae, and blue-green algae. The latter are actually a type of bacteria and are also referred to as cyanobacteria. In general, the blue-green algae appear to be the predominant species associated with bermudagrass putting greens and tees in the southeastern U.S. A preliminary survey of putting greens in south Florida demonstrated that the dominant blue-green algae species were Oscillatoria, Lyngbya, and Nostoc. This was also found to be true on bermudagrass greens in Mississippi (Maddox and Krans, 1991). In general, the algal species associated with aquatic environments, such as lakes and waterways on the golf course, are not the same species associated with the greens and tees.

There are two types of algal problems on putting greens and tees, surface algae and the "black layer" phenomenom. "Black layer" is a more complex problem that includes not only blue-green algae but also sulfur- reducing bacteria and specific anaerobic soil conditions created in the soil. The controls for black layer are quite different from controls for the algal slime or crusts observed on bermudagrass putting greens surfaces. The research discussed below was conducted on surface algae as that appears to be the primary problem observed in Florida.

Algae are not plant pathogens. They do not infect (penetrate) the turfgrass plant and cause a disease. If the algae population increases significantly, they will "slime" the turf and create thin to thick crusts on the soil surface, but they have not physically attacked the turfgrass. While it is possible that blue-green algae produce toxins which may inhibit turfgrass growth, this has not been proven to date. In most cases, it appears that the algal crusts are simply preventing the bermudagrass from physically growing into this area.

Why do blue-green algae "bloom" on putting greens? Because we (Mother Nature and humans) provide them with the perfect environment. By mowing the putting greens extremely short, especially in the summer months, the soil where the algae live all year is exposed to sunlight. Add in excessive rainfall or irrigation, frequent nitrogen applications and a high soil surface pH and an ideal breeding spot for blue-green algae is created.

You must determine the cause of the algal problem before you attempt to fix it. The cultural controls are fairly obvious - dry out the soil surface, break up the algal crusts and alter management or environmental factors which are conducive for algae development. A shady area that never dries out is a perfect place for algae. Document the problem with pictures and facts to convince the management or membership that the landscape needs to be altered.

The weather cannot be controlled, but it is possible to alter irrigation practices that may be contributing to the problem. The algal crusts can be broken by spiking, verticutting, aerifying, hand-raking or any other method that physically disturbs the crusts. Drying out the soil surface can be difficult, especially during a summer with above normal rainfall. Light topdressings

Research Table 1.

Fungicide use to control blue-green algae (cyanobacteria), before the algae develop (preventatively) and after they develop (curatively) on the FGCSA bermudagrass putting green at the Fort Lauderdale R.E.C

Treatment/Formulation[x]		Rate per 1000 sq ft	Spray Interval[y]	1993 Quality Scores[z] Preventative	1993 Quality Scores[z] Curative	1994 Quality Scores[z] Preventative	1994 Quality Scores[z] Curative
Daconil 2787	90% WDG	3.5 oz	14 days	5.9 bc	5.2 b	5.5 a	3.2 b
Daconil 2787	90% WDG	3.5 oz	28 days	5.3 d	NT	4.4 c	NT
Daconil 2787	90% WDG	6.5 oz	14 days	6.5 a	5.5 ab	5.5 a	3.8 a
Daconil 2787	90% WDG	6.5 oz	28 days	5.6 cd	NT	4.6 bc	NT
Dithane T/O	75% DF	6.0 oz	14 days	6.6 a	6.0 a	5.5 a	3.6 ab
Dithane T/O	75% DF	6.0 oz	28 days	6.1 b	NT	4.9 b	NT
Dithane + CS-7	75% DF	6.0 oz	14 days	6.5 a	5.8 ab	NT	NT
Dithane + CS-7	75% DF	6.0 oz	28 days	6.5 a	NT	NT	NT
Dithane M-45	80% WP	6.0 oz	14 days	NT	NT	5.5 a	3.6 ab
Fore	80% WP	6.0 oz	14 days	NT	NT	5.5 a	3.5 ab
Algaen-X	20% L	4.2 fl oz	14 days	4.3 e	NT	3.9 d	NT
Algaen-X	20% L	12.5 fl oz	14 days	3.9 f	NT	NT	NT
Control				4.3 ef	4.1 c	3.9 d	2.6 c

[x]Daconil 2787: ISK Biosciences chlorothalonil; Dithane T/O, Dithane M-45, Fore: Rohm & Haas formulations of mancozebAlgaen-X: Scotts (Grace-Sierra) quaternary ammonium salts; CS-7 is a spreader-binder surfactant that was added at the recommended rate of 1 pint per 100 gallons of fungicide solution.

[y]Preventative applications were made on 14 day and 28 day intervals and were initiated before algae had developed. Curative applications, applications made after the blue-green algae were already present, were made on 14-day intervals only.

[z]Quality scores are based on color and density using a scale of 1 to 10 (best quality). Values are means of four replicate plots for nine (1993) or 10 (1994) rating dates. Means in the same column followed by the same letter were not significantly different (P=0.05) according to Waller-Duncan k-ratio t-test.
NT=not tested.

of root-zone mix will help absorb some of the moisture and will physically mask the problem areas. However, during the rainy season, it may require more than cultural controls to prevent a blue-green algae problem.

While some superintendents have used a dilute bleach solution (ex: Chlorox) for algal control, the product does not have a legal turf site pesticide label. Certain fertilizer materials, copper sulfate and hydrated lime, have been recommended for algal control. Copper sulfate has a tendency to burn closely mowed turfgrass - especially if the wrong formulation is used. Hydrated lime is effective in initially dessicating (drying out) the algal layer, but it also helps to create an ideal environment for blue-green algae because it increases the soil surface pH. If the root rot disease Bermudagrass Decline is active, the hydrated lime will increase disease activity as this fungus prefers the high soil pH also.

In 1991 when preliminary studies on blue-green algal control were initiated, the only legal chemical control for algae was the fungicide mancozeb (ex: Rohm & Haas Fore, DuPont Manzate 200, LESCO 4 Flowable Mancozeb). While there is nothing wrong with having only one chemical for control of an organism, it makes plant pathologists like myself very nervous since this would be an ideal situation for chemical resistance to develop within a population. There was also some concern at that time that this fungicide chemical group would be removed from the market. That would have left the golf course community without a legal chemical control product. This was the motivation for initiating this research project.

The two most likely fungicide candidates for algal control at that time were anilazine (ex: Dyrene) and chlorothalonil (ex: Daconil 2787) because these products had been or were still being used in paints for inhibiting algal growth. Anilazine was not included in the study since it was not expected to be manufactured, and so available for use, in the near future. Quaternary ammonium salts (e.g. Algaen-X) were evaluated beginning in 1993.

Materials and methods

The experimental site for the chemical trials in 1991-1994 was the FGCSA Research Green located at the Fort Lauderdale Research and Education Center. The 'Tifdwarf' was cut 6 days a week at 3/16 inch. During the summer cycle (May through October), the green was fertilized with 1/2 lb. nitrogen per 1000 sq. ft. every two weeks using a slow release fertilizer source. No other chemical pesticides were applied as a broadcast treatment. If necessary, Bacillus thuringiensis (Bt formulated as DiPel) was used to control sod webworms, and spot applications of Dursban insecticidal bait were used for mole cricket control.

To increase algal development, the experimental site was irrigated twice each

Over the four-year period, various fungicide treatments were examined...

day (10 AM and 4 PM) for 7 minutes, even on days when it rained. No cultural controls were utilized in these studies, so the area was not verticut, aerified or topdressed during the study periods (July-October) each year. This method was utilized to insure that the fungicides were being evaluated under moderate to severe environmental conditions for algal development. In other words, a superintendent's worst nightmare come true!

Over the four-year period, various fungicide treatments were examined but Dithane (75% mancozeb DF; the labeled rate) and Daconil 2787 (90% chlorothalonil WDG; two rates) were always examined each year as preventative treatments applied at 14 day intervals. In other words, after the first application of fungicides was made, the twice daily irrigation cycles were initiated. In 1993 and 1994, these fungicides were also examined as: (a) preventative treatments applied at 28 day intervals, and (b) curative treatments applied at 14 day intervals in which the fungicides were not applied until the algal population had increased substantially. Other treatments during the four year period included quaternary ammonium salts (ex: Algaen-X), maneb, Dithane (mancozeb) with a surfactant, and three different formulations of mancozeb.

The fungicides were applied in 3-5 gallons water per 1000 sq. ft. using a backpack CO2 sprayer and boom with 40 psi pressure at the handle and stainless steel 8002 Tee Jet nozzles. Deionized water was used to eliminate any interaction due to water source, especially pH effects. The 3 gallon rate was used for all fungicide treatments except the Algaen-X which was applied in 5 gallons water according to the label and information supplied by the company (Grace-Sierra) in 1993. Each plot was 25 sq. ft., and each treatment was replicated four times.

Results and discussion

The rate at which the algae developed differed between years, primarily due to the precipitation received during each study period. Plots were rated for quality (color and density) and amount of algae present in each plot. Only quality scores are presented as they are the most accurate assessment of fungicide effect since some products were phytotoxic. The area used for this experiment was of limited size, so it was impossible to use every treatment every year. Results for 1993 and 1994 are presented in Table 1. During July through September, the FLREC received 25 inches of rain in 1993 and 39 inches of rain in 1994. Except for Dithane M-45, only data for products with legal turf site labels are presented. One note on interpreting the table, values in a single column followed by the same letter are NOT statistically different.

Prevention or reduction in algal development was consistently observed when chlorothalonil (both rates) and mancozeb (the labeled rate) were applied at 14 day intervals AND treatments were initiated at the time the environmental pressure for algal development increased

Prevention or reduction of algal growth possible with timed application of fungicide...

(i.e., initiation of twice daily irrigation). In both years, these treatments were significantly better than the control treatment (no fungicides). The use of a surfactant with mancozeb and the different mancozeb formulations did not increase or decrease its overall effectiveness.

When these products were used at 28 day application intervals, the fungicide treatments still provided better quality than the control but usually had significantly less quality compared to the 14 day application treatments. As can be seen in the graph, the turfgrass quality would increase after a fungicide application and then slowly decrease over the 28 day period. With the 14 day application interval, the quality was more uniform over time.

When the fungicide applications were initiated after algae had developed (curative treatments), the quality of the treated plots was still better than the control but did not equal the preventative fungicide treatments. This was especially evident in 1994 when the environmental conditions were quite conducive for algal growth.

The 90% WDG formulation of Daconil 2787 was utilized throughout the four year period for consistency during the overall study. When you are working with small plots, dry formulations are much easier to measure than flowable materials. This formulation has since been replaced with an 82.5% SDG formulation. Check the Daconil 2787 labels for the current legal use rates.

Mancozeb fungicides are one of the very few fungicides that have a label stating that use of a surfactant may increase efficacy. There did not appear to be a strong advantage in this particular study. Daconil 2787 should not be mixed with a surfactant as one is already part of the formulation. A minimum of 2 gallons water per 1000 sq. ft. should be used to mix all fungicides. (Yes, the labels do state this!!) I used 3 gallons in this study because I wanted to be sure the fungicides came in contact with the algae. Remember, you want to stop algal growth. The algae are not growing on the leaf surface but on the soil surface!

Different mancozeb formulations were evaluated as some superintendents believed they observed better efficacy with mancozeb formulations containing the blue dye. Dithane T/O and Dithane M-45 (which is not labeled for turf) do not contain the blue dye that Fore contains. Dithane M-45 was used because its formulation is more similar to Fore than Dithane T/O. No differences were observed between these formulations.

There has been some concern about using mancozeb products, which contain zinc, due to soil test reports that indicate the soil contains an "excessuve" amount of zinc. The word "excessive" is misleading. Usually, soil zinc levels over 20-60 mg/kg soil are considered excessive, especially when you consider that turf normally only needs a few mg to satisfy its nutritional requirements. However, turfgrasses can tolerate much higher soil zinc levels. A study by Spear and Christians (1991) on bentgrass demonstrated that even at zinc soil levels of 4000 mg/kg, there was no consistent plant damage. I am not aware of any reports of zinc toxicity of bermudagrasses used on golf courses.

Quaternary ammonium salts for use on turfgrass sites are sold under the trade names Algaen-X and Consan Triple Action 20. There has been considerable confusion regarding the appropriate use of these products, primarily because the label itself is confusing and information provided by one company was inconsistent with the label. In 1993, two rates