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ABOUT OUR COVER:

The 9th hole at the world renouned Tournament Players Club in Ponte Verde, Florida the golf course superintendent is Bobby Weed.



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PRESIDENT'S MESSAGE

It is a great privilege to recieve the confidence of my peers to be elected President of what many people feel is the strongest Superintendent Chapter in the nation.

The last five years the FGCSA has accomplished its goals because of aggressive and intelligent leadership along with strong cooperative Chapters. The initial goal was to consolidate the state's 9 local Chapters to become a strong influence nationally in GCSAA. The influence was obtained in becoming the largest voting group in the nation, the election of John Hayden, CGCS, to the GCSAA Board, winning the National Golf Tournament Chapter Championship twice out of the last three years, receiving several key committee assignments within GCSAA along with gaining significant recognition by wearing the brightest blue jackets in GCSAA history.

With the FGCSA original goals accomplished, a new direction was approved at our last Board meeting. The long range planning committee presented the following: A program that consisted of continuing exciting programs and also implementation of an aggressive public relations campaign. The main goal of our new direction will be to promote the professionalism of the golf course Superintendent at his own club and with the golfing community. More information on how this project will be carried out will be forthcoming.

The FGCSA will continue to work closely with F.T.G.A. and I.F.A.S. of the University of Florida with ongoing research projects. The main topic in 1983 creating great concern among many Florida golf course Superintendents had to be "Bermudagrass Decline". Recent research although it has not provided a cause or cure, it has defined its symptoms, established factors affecting its occurrence, usual time of year and a cultural practice that retards the decline. The most important part of your job is to obtain this documented data and make your members and club aware.

I look forward to serving you during the coming year. Feel free to contact me or your Chapter External Vice President and let your feelings and suggestions be known. Remember, our Board meetings are open to all FGCSA members and I encourage you to attend.



South Florida Sunshine

By BRAD G. KOCHER Inverrary Country Club



THE FINER QUALITIES OF A GOOD SUPERINTENDENT

Pages of detailed information could be written about the vast amounts of technical knowledge a good superintendent must possess to excel in his profession. A superintendent must be a leader, a manager and possess skills in areas such as grasses, soils, plants, trees and flowers. He must be knowledgeable about fertilizers, chemicals, pumping stations, irrigation and irrigation hydraulics. He should understand some elemental chemistry, geometry, algebra, accounting principles and basic math. He should have a basic knowledge of electricity, hydraulics and fluids. He should understand equipment, equipment operation, maintenance and repair.

The list could continue to cover many, many phases of a vast variety of skills, professions and trades. And to be a very good superintendent, one must know a little bit about all of these technical aras or at least be able to understand, diagnose, evaluate and make common sense decisions based on a lot of variables.

If there are shortcomings in that area, it is a good superintendent who can weigh and analyze mechanical problems that he may know little about. There are usually several options when your mechanic presents you with a problem and says, "Well, what do you want to do?" Equipment can be repaired, replaced, another piece of equipment cannibalized, re-engineered or junked. A good superintendent who asks all the right questions can usually make a good common sense decision even though he may know very little about the technical aspect of a particular piece of machinery.

Another quality a good superintendent should possess is the ability to relate his knowledge of turfgrasses in maintenance to his particular club and its golfers.

One would not necessarily maintain a golf course to the same standards for a membership that has 75% of the golfers under 20 handicap compared to one that has 75% of the members with handicaps over 20.

Different calibers of golfers want different conditions. Golfers above 25 handicap would generally find conditions that the touring professionals play under practically impossible. Golfers of higher handicaps are not used to "pinching" the ball off a tightly mowed fairway nor would they find desirable greens that roll ten feet on a stimpmeter.

A good superintendent knows his golfers and their desires. Granted there are some agronomic practices that are necessary that some golfers find unpleasant, but as a rule, conditions should exist that are fair and receptive to the golfing talent of one's membership.

Most of the variables concern height of cut of fairways, roughs and greens. Low handicap golfers generally want short fairways and long rough and the higher handicappers want longer fairways and shorter rough. It is very difficult at times to strike a balance between these two factions but this is where the knowledge, talent, tactfulness and salesmanship of a particular superintendent comes to bear.

A good example is the speed of the greens. I happen to prefer a faster putting speed on greens because it is a fairer test of putting skill. So it is easy for me to justify to a higher handicap golfer who may prefer slower greens why faster greens are better. This usually appeals to both the low and high handicapper. I can usually sell a lighter weight putter and putting lessons along with the rationale.

The one other area that can separate the men from the boys in superintendent excellence is the manner in which a superintendent conveys his practices, beliefs and desires to his greens chairman, committee, owner or manager. A superintendent's ability to "sell" his ideas can make life pleasant or miserable.

Good salesmanship can initiate programs to upgrade present course conditioning. Most owners are quick to recognize a wise investment, especially if it is properly presented. Most golfers would like to see course conditions improve and a good superintendent can recognize shortcomings whether it be equipment, turf renovations or irrigation system changes. If desired course changes are thoroughly researched and presented in a manner that is logical and comprehensible to those who hold the purse strings, those ideas have a far better chance of being approved.

(Continued from page 10)

A good superintendent is able to relate to his superiors on their level. For the most part, they (owners, managers, chairman) are, or have been, highly educated successful businessmen. It is necessary to present data that makes logical financial sense and can show significant course upgrade or at the least keep the course maintained to proper standards.

A good superintendent will give his golfers the best course for the money spent. He can also show where increased funds will produce a better product, and has the ability to spend these funds wisely.

A good superintendent is a good investment.

Instead of talking in depth about all the technical aspects, I wish to highlight the intangibles. How does a good superintendent coalesce and communicate all of this information to his maintenance crew in an effective manner? How does he translate his knowledge of turfgrasses to the unique conditioning of his golf course for his golfers? Also, how does the superintendent coordinate all his communications to his greens committee, board or owners?

Much of this boils down to the hard fact that a superintendent must be able to sell his ideas, concepts and technical knowledge to a lot of different people. I can sit here all day and know that I may be a good golf course superintendent. I may possess all the knowledge, perception and common sense that it takes to get the job done. However, if I cannot convince the maintenance crew, golfers and those to whom I report, it will be difficult to excel at my profession.

The maintenance crew must be an extension of the superintendent's maintenance procedures. Each of us have basic maintenance practices that are adhered to industry-wide. Then there are particulars that distinguish superintendents from average, better and best.

It is imperative that we be able to communicate to the workers who are actually performing the work, what it is we want done, how to do it and, of equal importance, why. We will only be as good as the people who do the work. I do not believe any of us would tell a new employee to just hop on a greensmower and mow greens.

It must be explained to the employee how the machine works and its function. The employee must be shown how to operate the mower and then be watched while he operates it. He has to know how to make the first pass on the green, how to make a straight line, which direction to mow, and how to make a clean-up lap. He must know how the mower should leave the green. He should know what to look for in a hydraulic leak, not to overfill the gas tank and how to tell if the engine is operating properly. He should know if the machine is cutting properly, and what it looks like if it is cutting im-

properly. He should know what to do if all of the conditions are not present.

Most importantly, he should know why all of this is being done. A good superintendent can communicate all of this information so that the person doing the task is an extension of the superintendant. The worker should have the knowledge through proper training to do the job as well as the superintendent.

Once all of this knowledge is communicated and demonstrated, there must be a system of checks and balances or follow-up to insure it is being done correctly. In this manner, the job will be done effectively and to the quality standards a good superintendent would desire.

As you can see, comprehensive communication is the key to insuring things get accomplished in a timely and accurate manner. A different type of communication is necessary when dealing with your mechanic and problems that arise with equipment.

It is usually quite easy to know when a piece of machinery is operating improperly, whether it be engine-related, quality of performance or cutting ability. It is important that a superintendent can properly explain the malfunction of a piece of machinery to his mechanic. An "it doesn't mow right" symptom is vague and ends up taking a great deal of the mechanic's time troubleshooting things that may not be wrong. Be specific. Seek out specific symptoms and then let the mechanic use his expertise to correct them.

Quite often, by taking the mechanic on the course when the equipment is operating, or better yet, letting the mechanic operate it, is the best way for each party to understand equipment shortcomings.

There are good superintendents who have a good basic understanding of equipment operation and repair. And there are even some excellent superintendents who could be successful mechanics if they chose to be in that trade. However, most golf course superintendents would probably like to understand more about the mechanical end of the business.





AGRICULTURAL SCIENCES

FLORIDA COOPERATIVE EXTENSION SERVICE

GOLF TURF NEWS

By BRUCE J. AUGUSTIN AND ED FREEMAN IFAS, University of Florida

Bermudagrass Decline Investigations

In recent years a localized decline and death of turf has been observed on bermudagrass greens. The symptoms first appear as chlorotic yellow patches, 8 to 24 inches in diameter. The turf begins to thin out, and eventually a bare spot will develop. It is common to see green shoots next to chlorotic shoots in the area around the edge of the patch. Affected areas have very poor root systems and a lack of rhizome development. Articles about Bermudagrass Decline with photographs were published in Florida Turf, Summer, 1982 and Grounds



Maintenance, October, 1982.

Research on this problem has concentrated in three basic areas. First, a number of chemical treatments have been evaluated for control of Bermudagrass Decline. Last year the compounds were sprayed on the turf surface. This year, we are injecting several fungicides with a nemaject to place the chemicals more effectively in the rootzone. To date no chemical control has been found. The second phase of our research is searching for possible causal agents of the decline. Bacteria studies are still continuing to determine why large populations have been found in bermudagrass turf. Also, we are investigating a brown fungus that has been found repeatedly on roots in affected areas. Thirdly, we are collecting data from superintendents on when the problem occurs, their cultural practices, turf and soil conditions, and control measures they have tried.

The best recommendation at the current time for control of Bermudagrass Decline is a cultural one. Aerification is extremely important to open up the soil and allow oxygen into the rootzone. Use an aerifier that will deeply penetrate the turf. Aerify as frequently as possible, every 3-4 weeks during the growing season. Next, topdress and work it into the aerifier holes. Topdressing will also help mask some of the damaged areas. Application of a nonionic wetting agent also is important to help water penetrate the soil, especially if there is a thatch layer. By following these practices when the chlorosis symptoms first begin, it is possible to check the problem. If Bermudagrass Decline is a reoccurring problem, these cultural practices should be followed throughout the summer.

Editor's Note:

At the research update on Bermudagrass Decline held on August 29th at Atlantis Country Club, Ed Freeman warned of the dangers of Pythium infections on high sand content greens. The following article by Dr. Clint Hodges from Iowa State University is quite informative and timely.



Newly elected officers of the Treasure Coast Chapter are from left to right: Joe Briguglio, Secretary (Indian Hills, Ft. Pierce); Chuck Pinkett, Director (Miles Grant, Stuart); Craig Baker, Vice President - Internal Affairs (Indian River Plantation, Jensen Beach); Adam Yurigan, Jr., Vice President - External Affairs (John's Island, Vero Beach); Bill Mangold, Treasurer (Martin Downs, Stuart); Jim Callaghan, Immediate Past President (Riomar, Vero Beach); Joe Snook, President (Riverbend, Tequesta); and Robert Hurst, Director (Jupiter Island Club, Hobe Sound).

ARE YOU ZEALOUS, CONSCIENTIOUS? WATCH OUT

If you should happen inadvertently to see a letter or memo from your boss describing you in flattering terms, don't run out and start spending the raise you are sure must be forthcoming. The boss may be speaking with forked tongue.

E. James Brennan, a St. Louis personnel consultant, reports in Personnel Journal that employee-relations executives, in order to write frankly about people without fear of the communications falling into the hands of those being written about, sometimes use a secret language of their own.

Some tongue-in-cheek examples of phrases whose true meaning is supposedly shared by those in-theknow:

Personnel Code	Translatio	
"Exceptionally well-qualified"	Made no serious blunders ye	
"Careful thinker" "Strong principles"	Won't make a decision Stubborr	
"Spends extra hours on the job"	Miserable home life	
"Average employee"	Not too brigh	
"Active socially"	Drinks too much	
"Zealous attitude"	Opinionated	
"Takes pride in his work"	Conceited	
"Uses logic on hard problems"	Finds another to do the job	
"Forceful"	Argumentative	
"Not the desk type"	Did not go to college	
"Conscientious"	Scared	
"Meticulous attention to detail"	Nit-picker	
"Of great value to the organization"	' Gets to work on time	
"Has leadership qualities"	Is tall or has a loud voice	



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By MICHAEL J. BAILEY Boca Greens Country Club

``A TRULY UNIQUE INDIVIDUAL'

The description of a Golf Course Superintendent is truly unique. Few other managerial positions within any industry require such diversification of knowledge as that of a Golf Course Superintendent. One most obviously have "a little knowledge in Horticulture"; however, this is only the beginning. Expertise must also expand to many other areas such as: management, accounting, business transactions, secretarial, public relations, psychology, chemistry, technical analyses, design, irrigational, mechanical, ecological, and any thing else just short of being god-like, because you always are supposed to at least "have a green thumb."

Considering there are over a hundred golf courses in Palm Beach County, very few courses are truly similar in nature, the span goes from public to very exclusive private courses and from 9 hole to 90 hole complexes. With such a diversification of knowledge and courses, is there such a thing as a stereotype Golf Course Superintendent? Well, of course not! Superintendents are probably some of the most unique people in the world! I have asked many Superintendents in Palm Beach County the question "Why are you unique?" Considering there are over 100 courses in Palm Beach County, what is it that makes you uniquely special in comparison to your peers? Just why do you exceed better than anyone else? These questions were asked without being quoted to allow the individual the freedom of revealing their true inner feeling, without the fear of embarrassment. Replies are as follows:

"I try to make my people happy, whether they are the workers, the members, or my boss. I treat people the way I would want them to treat me, because I am in a service business. This is maybe not unique, but the attitude I feel is unique, because I care about service. For example, if the members desire to have trees, we plant them. If they desire to have them removed, after mutual discussion, we remove them. I am not necessarily a 'yes man', but rather a service oriented Superintendent. Since Greens Committee Chairmen change yearly, goals, objectives, and areas of concentration change yearly. If the Superintendent can not visualize and accept the changes, then he is not performing a service to his Club."

"Having the broad knowledge of all phases of golf course maintenance, from construction through the aspects of maintenance of both northern and southern turf management programs, I feel that being able to use these experiences on a day-by-day basis, and relating this to the work crew, I can get the most out of my crew and make the course look the very best within my capabilities."

"I have the ability to communicate with the working management personnel at their levels. I have the ability to set up programs, whether they be for management, personnel management, or developmental projects and see that they are followed through with completeness and

(Continued on page 15)



(Continued from page 14)

thoroughness resulting in a product of the highest standards."

"I know what my objectives are, and I use all the means available to accomplish my goal, which is to have it perfect. I put 100% of my energies toward accomplishing that goal."

"I am a perfectionist and my inability to accept mediocracy produces constant frustration when dealing with mother nature. Because of this difficulty, I must constantly be striving for the best product available within my ability."

"I am a very good golfer and I feel that I can play as well as many of the club Professionals. I look at the golf course from a good golfer's point of view. I look at the height of cut, quality, contour of fairways, placement of trees, and thereby look at the points of view from not only aesthetics, but from the point of play from the low handicap to the high handicapper."

"I am good at getting the required job done by employee motivation. Even though the laborers low pay, along with the lack of professional skills, makes getting the job done most difficult. Considering these restrictions within my capabilities, I am able to overcome these problems and perform a job well because of my ability to motivate within. Motivation is the key to my success.

"I have the ability to maintain an above average golf course for an elderly membership that is not appreciative nor knowledgeable about the agronomics of maintaining a small, tight golf course."

"I have the ability to respond to adversity under pressure. I am able to maintain a level of consistency year round, even though the diversity of foul weather and the amount of heavy play can have diverse effects upon the golf course. There are so few Superintendents that are subject to my unique problems of an old course with heavy play, yet be able to maintain above standards for consistency of play."

"I enjoy communication on a regular basis with other Superintendents while I solicit and advise opinions regarding our industry. I want my golf course to be the very best as I will not tolerate problems, while other Superintendents will allow things to just slide by."

"I have the patience and flexibility to deal with various personalities and individuals at a private country club, whether they are the laborers, accounting department, board of directors, golf pros, club manager, or my superior, the greens committee chairman. This gives me the ability to produce excellent playing conditions year-round."

"My position as a Golf Course Superintendent

exists because of the fact that I've had a good education in turfgrass management and I've had a chance to work under a first class Superintendent. Although I'm young, and have not had many years of practical experience, my desire to learn and work many long hours has propelled me quickly through the ranks to become a Superintendent."

"Rather than settling for the ordinary, I strive to set a precedent of professionalism as a golf course manager that others will look toward as unique, but achieveable objective, which is to make the golfing experience as enjoyable as possible to the membership and their guests. I also want my maintenance operation to provide an enjoyable learning experience to my employees with the intent to create a strong sense of pride regarding job performance."

"I have the ability to be in charge of a complex of large magnitude at a rather young age, which reveals to upper management, an ability to supervise with maturity. Because of this freedom, I am even more aware of my power and I capitalize on the advantages of this fact. I do not abuse my privilege, but rather more acutely manage to the best of my ability, which I feel is better than what anyone else could do."

In summary, I believe there is a common denominator regarding the dominant attitude of Golf Course Superintendents. (Continued on page 16)





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(Continued from page 15)

We are individuals of total dedication to a profession that we are keenly proud of. We do not want to be stereotyped as "just people who supervise the mowing of the grass," but rather "managers of a highly sophisticated and technical science of golf course management." We are individuals with creative minds that must constantly be one step ahead of the membership and management. Because of this mental awareness to constantly be on top of a vast amount of land both agronomically and financially, we find ourselves constantly being mentally alert, innovative, and seldom going out and just having a "relaxing round of golf."

Lofts Presents Rutgers With \$27M Royalty

Bound Brook, NJ — Lofts, Inc. recently presented Rutgers University with one of the largest royalty checks New Jersey's state university has ever received. Jon Loft, Lofts President and Chairman of the Board, presented a check for \$26,764.02 to Dr. Lowell A. Douglas, Chairman of the Department of Soils and Crops.

The check represented a total of the royalties due on all seed from the 1982 harvest of Mystic Kentucky bluegrass, and several perennial ryegrasses -Palmer, Diplomat, Yorktown and Yorktown II (Domestic and European). All these varieties were developed at Rutgers University.

Mr. Loft described the occasion as "another link in the continuing chain of turf developmental programs between Lofts and Rutgers." The royalties play a role in the development of new varieties, because the money is used to sponsor further research and education.

At the ceremony, which took place on September 8, Dr. Douglas expressed his appreciation for Loft's cooperation. "The development of new varieties becomes more meaningful," Dr. Douglas noted, "when a company like Lofts promotes them, because Lofts' involvement increases public awareness that new varieties are available."

Also present at the ceremony were Rutgers researchers Dr. C. Reed Funk, Dr. Ralph Engel, Dr. Henry Indyk and Dr. Robert Duell. In addition, Lofts was represented by Dr. Rich Hurley, Vice President and Director of Research and Agronomy.

The presentation was held at Rutgers Horticultural Farm II on Ryders Lane in New Brunswick.

A similar ceremony occurred in August at the University of Rhode Island. At the University's Field Day, Dr. Richard Skogley was presented with a Lofts check for \$14,900. This represented royalties for one year's crop of Jamestown Chewings Fescue.

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Pine Tree Decline Research

Funded by Quail Ridge C.C. By DR. CHARLES H. PEACOCK Extension Turf Specialist — IFAS

Pine tree decline is a serious problem on golf courses in Central and South Florida. A recent poll of golf course superintendents indicated many had a serious decline incidence with 30% responding they had experienced the problem. Of these, 77% indicated they had a moderate to high incidence of the decline symptoms. The decline begins as a vellowing of the trees, followed by a gradual loss of needles leading to death of the tree. A research project awarded to Drs. Charles H. Peacock and Roger S. Webb, Assistant Professor of Forest Pathology, with the Institute of Food and Agricultural Sciences (IFAS) at the University of Florida, Gainesville, by the Florida Turfgrass Association (FTGA) Scholarship and Research Foundation focused on screening potential causes of the decline syndrome. This work involved sampling on four golf courses. Included were Royal Poinciana C.C. and The Club at Pelican Bay (Naples), Grenelefe (Haines City) and Quail Ridge C.C. (Boynton Beach). Needles from healthy and chlorotic trees and soil samples from the perimeter of the trees were analyzed for pH, soluble salts and nutrient content. Samples were also collected from irrigation water sources to check pH, conductivity for soluble salts, and hardness. This work was completed this past spring.





The Quail Ridge Country Club Greens Committee and Property Owners Association has carried this one step further by funding an applied study to determine if an effective method can be found for treating this problem. This commitment for a threeyear study will provide \$25,000 in research money for this project. Quail Ridge is a very tree-oriented landscaped community. Concern over the loss of native trees prompted Superintendent Tim Hiers to spearhead the funding of this project. He and agronomist Sathena Cabler are working in close cooperation with Drs. Peacock and Webb. (Ms. Cabler noted that Quail Ridge has a severe problem, and is continuously having dead trees removed.) Work was initiated at Quail Ridge the week of 31 May - 2 June. Trees were identified and treatments applied based on the results of the initial FTGA project. The Quail Ridge study is designed to ameliorate the decline of pines that is apparently associated with intensive landscape maintenance practices.

(Continued on page 19)



(Continued from page 18)

Treatments have focused on correcting nutritional deficiencies associated with the trees by one of two methods: Direct injection of nutrients into tree trunks or soil drenches of nutrients into root zones. Dr. Webb has had success with injection methods on pine trees in South Florida. The soil drench treatment would be favored for a variety of reasons including lower cost, less labor involvement and less wounding of trees, but it has not been field tested as to reliability. The soil drench treatment included 15 combinations of 4 nutrients alone or in combination. This will test which single element or combination is most effective in correcting the problem, providing a soil drench treatment can be effective.



Periodic evaluation will closely monitor progress of the trees and treatment areas. Dr. Peacock is especially interested in monitoring treatment effects on turf surrounding treated trees. This is an exceptional project Quail Ridge has undertaken in joining with the University of Florida to research a persistent and damaging problem.



It is hoped this study will lead to definitive treatment for correcting the decline problem. As research results are evaluated, more information on cause, effect and treatment will be made available.

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By RON ANDREWS Suntree Country Club

Florida

Crowfoots

The Path to Excellence

It's an easy enough question; What makes an outstanding golf course Superintendent? The concept is a common subject of discussion among Superintendents, but the true depths of the inquiry are demonstrated by the frequency with which we ask it of ourselves. Everyone's answers are different and mine are likely no better than your own. However, perhaps my thoughts can throw a little different light on yours so we can grow closer to an answer that is agreeable to everyone.

Our field draws upon the common knowledge of such a vast and varied group of professions, that it is often scary. How can one man stay well versed as a soil scientist, environmentalist, agronomist, entomologist, personnel manager, accountant, salesman, horticulturist, civil engineer, et al. The answer is, you cannot. However, if you're a good student and industrious in your efforts to better your abilities, then you can and must borrow from each of these fields. You borrow that which applies to you, your profession, and your operation. This task, too, is difficult, but not insurmountable. Other individuals and organizations are also collating this information. In fact, the real advantage to participating in professional organizations is the opportunity to share in their resources. The effort an individual puts forth in building his base of knowledge will determine the level of his personal achievement.

If you could find one quality that every excellent turf manager shares, it's his strong decision-making ability. Many tough decisions must be made on a seasonal and daily basis and no one can make good decisions if he is uninformed. When to topdress? How heavy? Do I have enough potash in the program? Should we go with less frequent applications of slow release fertilizers? How to hire ... when to fire? Is Mr. Foreman worthy of a promotion? Do we need an 8% budget? What will be given up if the budget must be cut? Quality

decisions make for quality golf courses.

Accumulating knowledge and making decisions is hard work. Which brings us to another attribute shared by the finest Superintendents, they are industrious, they enjoy their work and they put forth maximum effort. They appreciate these qualities in those they delegate work to.

Finally, the best Superintendents pride themselves on their connections, both private and professional. They belong. They share.

The abilities of the elite of our profession are based upon the wealth of knowledge shared by all of us. It is all but impossible for an individual to transcend the limitations of the professional culture we inherit. When clever individuals pride themselves on their own isolation, we would do well to doubt their cleverness. How much better to work within the culture to raise the base of common knowledge, so that we all may reach for that higher plateau. I doubt the golf course Superintendent exists who cannot gain from allying himself with any of the fine professional turfgrass managers' associations.





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AquaTurf's installation at St. Andrews utilizes five electronically controlled pumps, four of 75-HP and one of 15-HP. Other systems can be custom designed to meet the needs of golf courses throughout the United States. Complete information may be obtained by writing or calling AquaTurf.



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West Coast Buccaneers

By JOHN LUPER Countryside Country Club

Super Successful . . .

A definition of the word success is "the favorable or prosperous termination of goals or endeavors." For a golf course superintendent to be successful he must have short and long range goals and the skills to accomplish them. Identifying these goals and taking the right approach to solving them can be the difference between success and failure.

Experience is one of the main denominators to help a superintendent be successful. Through experience they learn the best approach to reach their goals and the goals of their employers. Mistakes are minimized and calculated risks are completely thought through before attempting to solve a problem. From their experiences the successful superintendent knows his most important quality will be his ability to communicate with all those around him.

The first group he has to communicate with are those who work for him. His talent for explaining exactly what needs to be accomplished and in what order gives his crew confidence in themselves and a chance to be an integral part of the total picture. Their participation in a well run organization will accomplish more work in less time and with less manpower. The superintendent who can mold this type of group will be best prepared to approach the next most important group — his superiors.

The successful superintendent realizes how important his involvement is at his club. He knows that

his decisions can have a total effect on how smooth his club is run, and he must approach his superiors with well thought out suggestions. For example, a budget that was hurriedly prepared will not tell the needs of the facility like one prepared well in advance with many hours devoted to it. A superintendent cannot just ask for a new piece of equipment. He has to justify its purchase and what it will do for the over-all quality of the club. Most successful superintendents have the respect and confidence of their employers. Gaining that confidence can insure proper consideration for all requests.

The successful superintendent also realizes the importance of his peers and their success. He knows his active participation to help the image of his profession will help them and himself.

As the turf management business becomes more sophisticated, superintendents will have to keep abreast by continuing their education through local, state, and national educational seminars. Not keeping current will eventually cause a failure of the goal to have the best maintained facility with the most efficient use of funds.

The goal of the Florida West Coast Golf Course Superintendents Association is to make available the talents of successful people, whether in the realm of education, management, or personal experience and to help all of its members reach their goals and reach the level of success they desire.







The position of Golf Course Superintendent is one of responsibility, as the expectations of the Golfing continues. The pressure applied from management is for tighter and tighter spending controls, as the position of Golf Course Superintendent changes complexion from that of a grower of grass to that of a true business manager. It is now taken for granted that we can grow grass and we are being judged more on efficiency, budget controls, personnel management, and playing conditions close to perfection.

From a survey of local superintendents I have compiled a list of items which they consider to be of major importance for fulfilling their job of superintendent.

These include:

- 1) The Maintenance Crew According to Phil Phalen the superintendent is only as good as the crew.
- Adaptability This is a job of changing conditions and we must be able to make the best of any situation.
- 3) Member Education If the membership has an understanding of the maintenance program they can work with you for improvement.
- Efficient Planning Setting goals and expected achievements leads to greater accomplishments.

Suncoast Sails

By ALLEN HANCHEY The Meadows Country Club

- 5) Achieving Most From Budgeted Dollar The list of items which need attention is endless, what can we afford with resources available to make the greatest impact.
- 6) Continuing Education New tools, ideas, and procedures surface each day and we must stay abreast to stay ahead.
- 7) Individual Personality How do we appear to others, first impressions are important as this often sets the stage for working relationships. A good personality often paves the road for crew respect or management credibility.
- A Good Knowledge Of The Game We are evaluated in the end on the playability of the golf course.

It is easy to understand that all of these topics are of major importance. To fail completely on any one item would certainly make you less than an effective superintendent. The greater your proficiency on each of these topics make us more valuable as a superintendent.

With an understanding of what is involved to become a truly good superintendent we can really evaluate ourselves. Often times, confronted with day to day situations, we tend to concentrate on one portion of our job and thus slack another portion to be the most effective superintendent possible. Perhaps we should evaluate ourselves more often instead of waiting for someone else to do it for us.



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4381 N. Brawley, Fresno, CA 93711 (209) 275-0500 TWX 910 362 1167 **By JAMES P. CALLAGHAN Rio Mar Country Club**

An Interview With a "Good Superintendent"

Treasure Coast

Progress in the golf-turf industry over the past two decades has been phenomenal. Tom Burrows, Golf **Course Superintendent of the Turtle Creek Club in** Tequesta, has endeavored to make the best of his 22 years as a superintendent and is considered one of the finest by his peers. He has witnessed the transition from greenkeeper to total manager first hand and has graciously agreed to share his comments on what makes a good golf superintendent with the "Florida Green" readers.

Basically, Tom's approach to becoming a successful golf course superintendent has been achieved by utilizing the SEP (Serious, Enthusiastic and Prepared) method. He commented, "To be a good superintendent, you must take your job seriously. The golfers out there might be playing a game - but we're not!" Tom continued, "Enthusiasm is a must. There are times when this job can really get to you, but one must keep his chin up with a smile on his face. Enthusiasm is the best insurance for job security." With respect to preparation, "through careful and complete preparation in all phases of golf course management, a good superintendent will rarely be caught off guard," Tom stated.

Through the SEP approach, Tom always strives to become a better manager with constant selfimprovement. He stated that a good superintendent will continue his education by attending turf conferences, night schools, and seminars. He will also keep his nose in the various trade publications available to keep abreast of pertinent information

and developments. He further emphasized, "A successful superintendent is active in local. regional and national associations. He must share ideas with his fellow supers — an ostrich-like convergence rarely cuts it today." Tom added, "At many meetings there is an opportunity to play golf on other courses which is certainly a valuable avenue for discovering new ideas."

"Tide"ings

Tom, who holds an A.S. degree in Turfgrass Management from Penn State, also emphasizes confidence in yourself but don't be afraid to seek help when needed. He commented that if you come across a problem (who doesn't!) that you can always turn to a fellow superintendent, U.S.G.A., or university personnel for advice.

Burrows is a strong advocate for delegating responsibilities. He said, "If a superintendent is always running around trying to get the work done himself, he won't have the time to become a good superintendent and will never get to enjoy retirement - because he won't be around."

Use of public relations is another pathway to success for today's superintendent. Tom states that he makes himself presentable and available at all times to his membership. He often visits the pro shop and clubhouse, especially during busy periods. Lunch in the dining room is scheduled to insure his access to the membership.

(Continued on page 27)



A good superintendent is serious...

prepared . . .

and enthusiastic!



(Continued from page 26)

He keeps his employer informed of his overall progress and attends greens committee and board meetings — PREPARED. He tries to play golf at his course at least once a week in order to gain the same perspective of the golf course as the members have.

Having trained over 60 apprentice superintendents, Tom is keen with his employees for they are a reflection on him. He stresses pride and neatness at all times. This is also carried over into the appearance and operation at the maintenance facility. Tom stated, "Take care of anything which will reflect on you and your management abilities. Organization doesn't stop on the 18th green!"

Tom's abilities and success are definitely of high caliber. Before coming to Florida, he was Property Manager and Golf Course Superintendent for the Playboy Club Hotels in Lake Geneva, Wisconsin and Great Gorge, New Jersey. Prior to taking over at Turtle Creek eight years ago, he was Golf Course Superintendent at Mariner Sands. Tom has served on the Executive Committee of the Midwest, South Florida, Palm Beach, Treasure Coast and Florida Golf Course Superintendents Associations. Recently he was nominated for Vice President of the Florida G.C.S.A.

In closing, having the right attitude plays the most important part in becoming a good superintendent. Tom Burrows' SEP approach relies on two basic attitudes — seriousness and enthusiasm. Add preparation to the right attitude and you can't miss!



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Watching Your Tees & Q's

By STEVE BATTEN AND BUD WHITE United States Golf Association-Green Section Southeastern Region



Monitoring Soil Temperatures

New interest has begun for the use of soil temperatures as turfgrass tools. The most common use of soil temperatures is the estimation of shoot growth rates of bermudagrass and overseeded grasses. Several superintendents in Florida are discovering the relationship of turfgrass physiological events as well as a year-to-year pattern-to-soil temperatures in their areas.

There are two periods of the year when soil temperatures become important. These are fall soil temperature decline and late spring fluctuation of temperatures from intermittent cycles of cool to warm. In North Florida decline of soil temperatures in late fall and early winter is a predictable pattern from year to year. In South Florida, late spring and early summer soil temperatures can vary yearly which could explain phenomenons such as the retention of overseeded heat tolerant turfgrasses.

In 1983, late spring transition of overseeded perennial ryegrass and creeping bentgrass was common throughout Florida. The bermudagrass was not actively growing as early as previous years, and the overseeded grasses did not decline in vigor as soon as usual. There are several reasons for this. One is the unusual high amount of late spring rainfall. Another is the increased heat tolerance of the new commercial cultivars of overseeded perennial ryegrass. But cooler soil temperatures had the greatest direct impact on the spring transition.

The greatest variance in soil temperatures is in the spring each year. In contrast, they become stable and very predictable during late summer and midwinter. One of the first golf course superintendents in South Florida to recognize this was Bill Whitaker of Seminole Golf Club in North Palm Beach. Bill has recorded daily readings of 4 inch soil temperatures at dawn for over four years. He has observed that temperatures were exactly the same for January 1982 and 1983. However, in May, June, and July, the soil temperatures were from 1-4 degrees cooler for 1983 than for 1982. He also observed that the Penncross overseeded bentgrass has a much slower rate of late spring/early summer transition this year under the same cultural practices and overseeding rates.

Bill Whitaker also noted that it was August 1983 before average soil temperatures caught up with the average of previous years. Bill's observations could explain the late active spring shoot growth of the Tifdwarf bermudagress reported on several coastal golf courses in his area.

Ron Hill of Amelia Island Plantation near Jacksonville is another golf course superintendent who records daily soil temperatures. Ron's observations of soil temperatures from 1981 to 1983 in northwestern Florida are different than Bill Whitaker's. Ron observed the lowest average soil temperatures in May of 1982 instead of 1983. Very little difference was noted between the average May soil temperatures of 1981 and 1983. June soil temperatures were the same in 1982 as in 1983.

Both Bill Whitaker and Ron Hill have long term objectives in recording soil temperatures. They are reviewing soil temperature patterns and relating them to their cultural practices, such as fall overseeding and spring transition. Bill Whitaker has also monitored the amount of bentgrass mower clippings by baskets that are removed from the greens. He has found a direct correlation between soil temperatures and the rate of shoot growth. Likewise, he has observed a similar response to the bermudagrass by observing when it starts late spring active growth and when it is recessed in the fall.

Amelia Island Plantation and Seminole Golf Club are seaside golf courses. Soil temperature patterns could vary inland as close as 5 miles on other golf courses. However, the range of temperatures in which certain physiological plant responses occur will be the same at any location. Therefore, more superintendents should consider recording soil temperatures. There could be a wealth of information gathered at different locations that could correlate soil temperatures to common turfgrass practices.

Predictions could be made for the optimal time for overseeding, the results of spring transition, the best date for the first annual aerification, and even the need for nitrogen fertilization prior to a golf event. (Continued on page 29)

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If soil temperature information is to be recorded, then there are several factors to consider. First, they should be recorded at the same time every day. Bill and Ron each record theirs at dawn each day. At dawn the soil temperature at 3-4 inches is at a daily low point. Soil temperatures have approximately a one hour lag time for response from surface soil temperatures. Recording of air temperatures and rainfall should also be considered.

If daily highs are desired, then mid-afternoon around 3-4 o'clock, would be preferable. Daily averages could be estimated by recording both at dawn and in the afternoon. Keep notes on mower clippings, disease and other information in a log form. After three years, a pattern will begin to be apparent for soil temperatures on your golf course.

Soil temperatures are just one more way to observe the cycle of turfgrass events on the golf course.

AVERAGE 3 INCH SOIL TEMPERATURES AT AMELIA ISLAND PLANTATION IN DEGREES FAHRENHEIT

	1981	1982	1983
JANUARY	Same a	en this survey and	[wanter]
first	45	57	53
middle	37	38	39
last	46	46	48
average	42.5	47.0	45.5
MAY			
first	65	61	64
middle	70	60	70
last	75	71	74
average	68.4	66.5	69.0
JUNE			
first	77	72	73
middle	79	75	74
last	76	76	75
average	77.5	73.5	74.0

AVERAGE 4 INCH SOIL TEMPERATURES AT SEMINOLE GOLF CLUB IN DEGREES FAHRENHEIT

	1982	1983
JANUARY	and the second second	
first	66	66
middle	64	64
last	55	55
MAY		
first	68	68
middle	70	65
last	70	70
JUNE		
first	77	72
middle	76	74
last	78	73
JULY		
first	79	77
middle	81	75
last	81	73



PRESIDENT FORD OPENS EAGLE TRACE

President Ford in action. His swing has improved since retirement.



NORTH FLORIDA

By EDDIE SNIPES Selva Marina Country Club

"Superintendent: Take a Good Look At Yourself"

At some point in time we have stood in front of a mirror or a reflective body of water and looking at our own image answered questions about ourselves. Successful professionals have the ability to do just that and understand fully what has brought them to their present success. North Florida Golf Course Superintendents were asked to take a look at themselves and answer these questions.

- I. What do you see as your strength in your profession?
- 1. paying close attention to detail
- 2. problem solving quickly and efficiently "Jack of All Trades"



- 3. handling people, working with people, personnel
- 4. planning and observation
- 5. knowing your golf course and hard work
- 6. surrounding self with competent staff right people for right job, working together as a team
- 7. dedication to job
- II. What area of your profession do you feel you need to improve upon?
- 1. hiring of qualified crew members and trying to keep them
- 2. be more aware of up-to-date research and maintenance practices continue education
- 3. understanding labor laws as apply to minors, state and federal regulations
- 4. better communications, taking too much for granted, expecting crew to know and think as I do
- 5. better understanding of budget alignment
- 6. keeping job interesting, overcoming boredom of daily routine
- III. What was the most difficult task to overcome as a first time superintendent?
- 1. management having confidence in my abilities
- 2. lack of "how to actually get it done" experience
- 3. money just to basically operate with
- 4. superintendent before me syndrome Trying to "Let it blow over"
- 5. lack of personal confidence, second questioning myself
- 6. relying or feeling the need to rely on former boss too much searching past experiences
- 7. education of club members to different style of maintenance practices
- 8. uncertainty of ability to handle mechanical problems-machinery, equipment

The profession of being a golf course superintendent is without a doubt unique. Looking at and being able to evaluate our personal performances within our profession will enable us to keep the integrity of our profession.

The Gator Growls

By DAN L. HALL, JR. Imperial Golf Club



Recipe For a Good Superintendent

Five Superintendents from the West Coast were asked to list in order of importance from 1 to 5 prerequisites of a good golf course superintendent.

Our five superintendents listed these statements as number 1:

3 - Replied hands on experience.

1 - Said formal education.

1 - Stated a prime interest in both golf and grass.

These statements placed 2nd:

4 - Answered both education from practical experience and formal education.

1 - Said practical experience along with knowledge gained from schooling, other superintendents, meetings and reading up to date material.

These statements placed 3rd:

3 -Replied keeping up by reading combined with educational meetings.

1 - Answered working on the course for experience.

1 - Said getting along with others.

These statements placed 4th:

3 - Said working from employee through the ranks under a Superintendent.

1 - Answered keeping a good staff of employees.

1 - Replied having a good employer interested in both good golf and good turf.

These statements placed 5th:

4 - Said a good knowledge of turf and basic agronomics.

1 - Replied be a good jack of many trades combined with experience.

Summary:

Notice that except for No. 2 and No. 5, the ratio of opinions is quite diversified. Nearly all placed actual turf knowledge 5th on the list. Education and experience placed as high as the 2nd requirement. Hands on experience was listed most often regardless of placement. Working under a good superintendent from employee through assistant also ranked high.

Being a good business manager wasn't even listed. Having good employees, having good work habits and having a good employer were only listed once each.

We can see that the pre-requisites of being a good superintendent are as varied as golf courses and golf course superintendents. Thanks to those who took the time to complete the questionnaire and make my job of reporting for this issue a little easier. I promised anonymity so names were not mentioned. Thanks again fellows. Next time let's have more replies and greater participation.



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PLANTS IN TAMPA AND FT. PIERCE



By TIM HIERS

If you went to the average person on the street and ask them what TPC meant you might get responses like Tasmanian Peace Corps, a deadly drug or Typhoid Prevention Center. Ask a PGA Tour Professional and he will quickly inform you that it's the Tournament Players Club.

Located twenty miles southeast of Jacksonville within the Sawgrass-Arvida Resort Community the Tournament Players Club was built for major tournament golf and for a nationwide membership. Looking at the total property, the course in its natural environment could easily be a spot location to film a jungle adventure. Intertwined among trees and vegetation such as pines, large magnificent live oaks, cabbage palms, trumpet creeper, wax myrtle, scrub palm and broom sage is a golf course that's tough and demanding. Ratings from the gold pro tees are 75 and 72.5 from the blue tees. Other plant growth includes decidous gum and maple trees along with native yaupon, Confederate jasmine and general miscellaneous North Florida vegetation.

Construction began on the 415-acre site in the spring of 1979 and opened the fall of 1980. The entire property is surrounded by a manmade canal effectively making TPC an island. Greens and tees were sprigged with Tifgreen 328 bermudagrass and winter overseeding consisted of Marvelgreen rufgrass and Saver.



The seed was applied in early October and again in the middle of November. The October application was done to prepare for qualifying school the first week in November. Donny Hammond holds the course record with a remarkable 65.

The greens average approximately 5,000 squafe feet and combined with trees total about four acres. There are approximately thirty-five acres of Tifway 419 bermudagrass fairways. This is a good indicator of the strict demand on accuracy. The roughs and spectator mounds encompass about sixty-five acres and are a menagerie of grasses such as common bermudagrass, carpet grass, bahamagrass, centipede and lovegrass. Much of the lovegrass grows in native sand to form a beautiful but menacing natural rough. The use of broom sage on slopes and roughs adds a unique flavor of color not found on many golf courses. The first impression of the course aside from its natural beauty is fairly simple — a good shot is usually rewarded, a bad shot can be punished immeasurably.



Every hole has water in the form of lakes, lagoons or canals. These waters hazards can create as much havoc as the dense woods, natural roughs, mounds, traps and native bunkers. For the high handicapper a combination floater-beeper ball would be highly recommended unless he or she is a golf ball representative.

(Continued on page 33)

(Continued from page 32)

Don't be too intimidated by these remarks, for those who play TPC can direct their own destiny (to a limited degree) by the set of the markers they choose to play. During the trip around the course I observed that many were playing from the gold tees, an occurence that reinforced my opinion of a golfer/masochist relationship. In any event, they seemed to enjoy the environment as much as the golf.

The Tournament Players Club is a culmination of dreams and planning by PGA Tour Commissioner Deane Beman. A former Tour Player, Beman took office as commissioner in March of 1974 and visualized the players having a permanent home course. A course that would host a yearly tournament to test the eminent skills of the tour's top players. Beman wanted something unique and different. In essence, this would be the Players Tournament — a fifth major championship.

To help fulfill this dream Beman collaborated with world renown architect Pete Dye. Dye designed TPC on a tract of land inhabited more by the alligators than golfers. With only 4 feet of elevation above sea level, Dye designed a golf course whose purpose other than providing a home course and tournament for Tour Players was to implement a new concept.



This concept included providing natural spectator mounds (stadium golf) that increase seating capacity hole by hole. The eighteenth hole has a seating capacity of approximately 40,000 spectators. In addition, target golf, meaning tight landing areas and small greens to test the Tour Player's accuracy and mental endurance, would also reduce overall golf course maintenance. Remember this is a new concept, not expected to be perfect immediately but to improve through change and modification. After its second tournament the TPC was criticized by some players because they felt good shots were not always rewarded properly and they were not adequately involved with the philosophy and design of their own course. As a result, the Tour solicited the assistance of a Players Committee consisting of Hale Irwin, Ben Crenshaw,

Jack Nicklaus, Jim Colbert and Committee Chairman Ed Sneed. The objective of the committee was to retain the character of Pete Dye's design and not make the course easier but improve it. Their basic strategy was to tighten up the landing areas and redesign greens to make them more receptive to good shots.

Since its origin the Players Committee has been very constructive and helpful. Committee Chairman Ed Sneed has been described by Golf Course Superintendent Bobby Weed as sharp and diplomatic. Weed has worked closely with the Committee and Pete Dye to modify the TPC. It is a process that will take time and patience.

After assuming responsibilities as Golf Course Superintendent on February 1, 1983, Bobby Weed can't seem to find enough time to exert his positive attitude and influence. With the constant change and modifications and the demand for top quality playing conditions, he must draw on his practical expertise and education to manage and operate the TPC. A 1976 Graduate of Lake City Community College where he received a Technical Degree in Golf Course Operations, he also studied two years of business administration at Presbyterian College in South Carolina. His experience prior to TPC included two years apprenticeship under Ron Hill at Pete Dye's Amelia Island Plantation before his firsthand job at Ponce DeLeon Golf Course in St. Augustine, Fla. He managed there for approximately one and a half years.

Bobby Weed's rise to success in the golf management industry accelerated when he accepted the golf course superintendent's job at the Long Cove Club, Hilton Head, South Carolina. It was here that Bobby Weed and Architect Pete Dye developed a relationship that formulates a key ingredient at the TPC. Working very closely with Dve. Weed learned to anticipate and understand the architect's philosophies and desires. His practical experience of building Love Cove Club from the ground up has proven invaluable at TPC. A phone call and conversation with Dye can be transposed into accurate redesign or modification on the golf course. This is a tribute to the communication and friendship that time has nurtured between Dye and Weed.

Bobby Weed has a genuine love for the Tournament Players Club. He enjoys observing the club's real owners that have inhabited the site for many years. Alligators, raccoons, armadillos, water turkeys, fish hawks, owls, great herons, egrets, sandpipers, deer, bobcat, turkeys, turtles and even an occasional bald eagle can be spotted. He addresses most of his programs with the certainty and confidence he will eventually solve them. Drainage for the most part is excellent despite the low elevation. A series of canals around and throughout the property allows water level control. Thanks to good planning, shade is a minimal problem despite a large number of trees.

(Continued from page 33)

The soil profile consists mostly of sugar sand which aids drainage. During construction muck was excavated and shaped into spectator mounds. This contributed to better drainage.

Among Mr. Weed's significant problems are mole crickets and armadillos tunneling after mole crickets. Heavy play makes maintenance more difficult and the attention to spectator mounds is time consuming. Weed plans to counter this high cost by using growth regulators. With the TPC still a relatively new course, constant modifications and improvements detract from desired manicuring. Bobby Weed is willing to be patient and realizes that time will cure most of these problems.

Future projects at TPC include reseeding spectator mounds with a variety of grasses to shield areas worn by heavy foot traffic. A major project down the road will be construction of another 18 holes to accommodate resort play and reduce heavy traffic on the present course. The new design will probably offer more to resort than play tour standards. Enlarging tees is another item on the future checklist that will allow better distribution of surface wear.

The TPC has an ample maintenance complex that provides excellent facilities for the staff. The crew's lunch and locker rooms are an asset to the club management program.

Since its beginning some articles have been highly critical of the TPC. Bobby Weed feels they are unfair. One recent article published in a southern magazine criticized the budget at the TPC. Weed explains that at the time these people were looking at our budget, its composition included many capital related items. For example: 1. Re-design or modification cost; 2. Installation of parking lots; 3. Draining installations; 4. Tournament related expenditures (those with experience know the high cost); and other miscellaneous capital cost. Since the budget has been properly categorized it is very competitive with courses comparable to it. Golf Course Superintendents will be the first to insist that comparing budgets is the greatest disservice anyone can do for their club. In the fiscal year 1983 less was spent on maintenance at the TPC than in '82. Weed projects that the '84 will be 20% less than the '83 budget. That's progress that can only be obtained by a top quality professional and Bobby Weed is meeting the criteria.

His radio communication system has provided him with an outstanding supervision program in addition to saving countless man-hours and dollars. Bobby Weed is very conscious about the key ingredient in any outstanding program — personnel. With good leadership and programs such as C.P.R. training for his employees, Weed is building a solid future for the TPC. With the use of such cost



savers as steam cleaners, a Xerox copier (that greatly improves record keeping), a good mechanic and strong preventive maintenance program, he assures himself and the TPC of steady progress. In addition to the use of growth regulators to slow growth and reduce maintenance, he also mulches to further reduce costs and hand maintenance. His constant research and contact with universities and respected golf course superintendents across the country is a testament to his eagvrness to improve himself and the TPC.

The Tournament Players Club will continue to change and improve. Only the universal test of time will determine its acceptability or possible greatness. If Bobby Weed has anything to do with it, the changes for positive results will be greatly increased.



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Pythium and Sand Topdressing

By CLINTON F. HODGES Department of Horticulture Iowa State University Ames, Iowa

(Increasing evidence for Pythium induced root dysfunction of creeping bentgrass grown in high sand content mixes.)

The presentation made by me at the 1981 M.G.C.S.A. annual conference implicated Pythium in a root dysfunction of creeping bentgrass grown on reconstructed high sand content greens. The disease in question killed grass very rapidly and in a manner typical of Pythium "Cottony Blight". Examination of diseased plants, however, failed to yield Pythium or any other pathogen from aboveground portions of the plant. Pythium was found throughout the root system of diseased plants. It is believed that when a green on an old golf course is renovated to sand, Pythium may infest the sand



from the collar and apron soil of the old green. The sand probably offers little microbiological competition for the Pythium and increased levels of irrigation and fertilization of sand greens may further promote the Pythium. There is also some evidence that more root mechanical damage may occur in sand than in soil; this could contribute to Pythium infection. This problem has not been observed in the roots of plants grown in traditional soil mixes.

To date, we have isolated four species of Pythium from the roots of creeping bentgrass associated with rapid death of infected plants. We are currently in the process of identifying the isolates to the species level and testing them for pathogenecity. It has been possible to infect roots in greenhouse studies and in some cases reduce the rate of growth of infected plants. Our present observations suggest that the Pythiums in question may infect the roots and co-exist with the plants with minimal damage under mild growing conditions. It may necessitate some form of environmental or cultural stress before death occurs. There are two outstanding problems for the superintendent relative to this disease. These are diagnosis and control. The rapid death of infected plants appears to be due to a foliar pathogen. However, examination of dying leaves usually fails to yield any pathogens and often times even saprophytic organisms are not present. When the root systems are examined they usually appear normal in size and color. Because of this it is assumed that root pathogens are not present. These normal appearing roots can, however, be severely infected by Pythium. The Pythiums associated with this problem do not cause a rot and the degree of discoloration may not be detectable with the naked eye. We have found that when we properly incubate what appears to be a healthy root from these diseased plants, Pythium will grow from the root within six hours. We are suspicious that these Pythiums damage plants by interfering with water relations, not by rotting.

Control of this problem in the field remains elusive. Intense aerification followed by application of Pythium specified fungicides into the aerifier holes may slow the disease. There is some indication that wetting agents used in conjunction with the fungicides may be beneficial. It also appears that following renovation of a green the first time the disease strikes it most severely; each subsequent year it becomes less severe.

Our primary research objectives for the next 2-3 years will be as follows: 1) Continue to collect and identify Pythium species associated with roots. 2) Determine pathogenecity of Pythium species and the conditions necessary for injury or death to occur. 3) Determine the nature of the pathogenecity; i.e. in that the roots are not rotted, how are the plants ultimately killed. 4) Examine approaches to control.

FLORIDA LEADS NATION IN AMERICA'S 100 GREATEST COURSES

The November issue of Golf Digest listed their biannual rating of America's 100 Greatest Courses. Again our state posted the most courses listed in the elite group with eleven listed. They are as follows:

TOP TEN Seminole Golf Club North Palm Beach Bill Whitaker, CGCS

THIRD TEN Pine Tree Golf Club Boynton Beach Hal Hicks, Supt.

FOURTH TEN Jupiter Hills Golf Club Jupiter Dick Herr, Supt.

Bay Hill Club Orlando Jim Ellison, Supt.

FIFTH TEN Doral Golf Club (Blue) Miami Sam Kruger, Supt. SECOND FIFTY JDM Country Club (East) Palm Beach Gardens Carl McKinney, Supt.

Mayacoo Lakes Country Club West Palm Beach Mark Henderson, Supt.

Grenelefe Golf Club Haines City Paul Hickman, CGSC

Innisbrook Country Club (Copperhead) Tarpon Springs Arlin Grant, CGSC

Sawgrass Golf Club Ponte Vedra Beach James Shine, Supt.

Tournament Players Club Ponte Vedra Beach Bobby Week, Supt.



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CURVULARIA IN FLORIDA GREENS

By LYNN GRIFFITH

Most golf course superintendents are familiar with basic turfgrass pathology and the common turf diseases, such as brown patch and dollar spot. One turf pathogen which is not well understood, but frequently encountered in Florida is the fungus Curvularia. The disease has been around for quite



some time, but has been popping up increasingly in turfgrass pathology diagnoses, especially during the exceptionally rainy weather of the past year. It is a common disorder, but unfamiliar to many superintendents.

The hosts of Curvularia include bermudagrass, annual and Kentucky bluegrass, creeping bentgrass, Poa trivialis, and fine-leaf fecue. The fungus also infects gladiolus and clover, but is primarily a turfgrass disease. There are four major species of Curvularia which infect turf. Unlike most turfgrass pathogens, it can be found on most any grass species, but it infects very few non turf crops.

Curvularia is very similar in many ways to Helminthosporium. In fact, some pathologists refer to it as the Helminthosporium-Curvularia complex. Both fungi are pigmented, and the spores are quite similar, even to a trained pathologist's eye. The Curvularia spores are a bit stubbier, however, than those of Helminthosporium. The two fungi are sometimes found together in diseased turf.

There is some question as to whether Curvularia is a turf pathogen at all. It has been described a number of times as a "stress pathogen", meaning that it will cause disease after something else is already wrong with the turf. By this, I mean anything which may weaken the turf, such as nematodes, Pythium or Rhizoctonia, nutritional problems, poor soil aeration, excess moisture, or compaction. Curvularia may be found in almost any grass debris, even if the turf is healthy. The fungus is an excellent saprophyte, meaning it exists or persists in dead and dying tissue. The ct nsensus of opinion seems to be that Curvularia will invade turf that is already weakened and become a secondary pathogen.

Curvularia is primarily a leaf and sheath rot in the bermudagrass greens in Florida. The grass blades turn yellow from the tip back, then turn tan or brown. Often the older leaves further back on the plant are affected, whereas the newest leaves are not. This is probably due to part of the intensive cropping practices used on Florida greens, where the grass temporarily outgrows the fungus. Curvularia will often be involved when a formerly healthy looking green will rather suddenly fade or become thinned.

Culvaria is basically a warm, wet weather fungus, growing best when temperatures exceed 75 degrees, but especially at 85 degrees and above. It often appears to attack turf which is suffering from heat stress or high temperature growth stoppage, especially when moist, humid conditions are also present. The heavy rains of the past year or so, along with the fairly warm weather in some parts of the state have made it rather troublesome. The fungus is often encountered in heavy dew periods in greens which are shaded for a good part of the morning. It is also more of a problem in highly compacted, poorly aerated soils. The disease is not nearly as bad on

(Continued on page 40)



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WHAT A PRICE TO PAY!

We all know that the prices of various goods advance at different rates. Some will shoot ahead, while some will remain static. What would happen, though, if you took the price trend for the last five years and projected it to the next 10 years, or to the year 2001?

That is exactly what Manplan Consultants, a Chicagobased management consulting firm, has done in a recent study. Here are projected prices for various goods based on their price trends in the past 10 years (are you ready?)

	1973	1977	1987	2001
Low priced car	3,000	5,000	17,700	105,000
High priced car	6,500	12,000	55,320	471,240
Private college tuition	3,000	3,840	7,219	17,510
Average house	34,500	54,000	191,160	1,134,000
Bar of soap	.15	.35	3.01	61.12
Toothpaste	.39	.79	4.89	62.80
Rump roast (lb.)	1.49	1.49	1.64	1.89
Ground beef (lb.)	.89	1.19	2.57	7.54
Coffee (Ib.)	.70	3.25	163.86	39,642
Jelly (small jar)	.25	.59	5.28	113.98
Sunday Newspaper	.30	.60	4.38	70.92





PGA Tour Commissioner, Dean Beman, driving from 1st tee.

(Continued from page 38)

fairways. It will persist for years in decaying turf debris, and if he's looking for it, a pathologist can find latent Curvularia in almost any turf sample.

Because Curvularia is so similar to Helminthosporium, those fungicides which control Helminthosporium will generally control Curvularia. The most effective compounds seems to be Daconil and the Mancozeb fungicides (Manzate 200, Dithane M-45, or Tersan LSR). Other fungicides which have been used include Actidione, either alone or in conjunction with Terraclor or Thiram. We don't feel that the cadimium fungicides are particularly effective against Curvularia.

Because Curvularia is so prevalent in stressed or dying tissue, at one time several turf pathologists considered it to be a major factor in Bermudagrass Decline. Subsequent investigations, however, have resulted in the conclusion that it is not a primary cause of Bermudagrass Decline. It is frequently found in "declining" greens, but probably as a saprophyte or secondary pathogen.

When Curvularia is diagnosed as a pathogen in a fading green, the superintendent must first ask himself what is the real, underlying cause. Its presence indicates that something else is wrong. The fungus itself should be treated, but for full, lasting recovery, the primary cultural disorder must also be addressed. Many times this year the weather has aggravated an already existing problem in the root zone. As a result, the lush, well-fed grass plant could not support its foliage properly, and Curvularia invaded the weakened tissue. Thus, in order to control this disease, the superintendent must combine the use of proper chemical controls with fundamentally good turf maintenance practices.

Wesco-Zaun/Toro Announce Michael Swanson Outstanding Salesperson Award

Wesco-Zaun, distributor of Toro products for the west coast of Florida, has announcez that Michael Swanson has been honored as the Southeastern Regional Master Salesman for Toro Commercial Turf Products. Swanson was presented a special blazer for most outstanding Toro turf products salesperson in the Southeastern United States at the annual Toro Distributor Convention on August 2 in Minneapolis, Minnesota, headquarters for Toro.

Swanson is currently the President of the Florida Turf Grass Association and represents Wesco-Zaun and Toro in cities, counties, municipalities and parks on the west coast of Florida.

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SPOTTED SPURGE

(Euphorbia maculata L.)

By STEVE BATTEN

Spotted spurge is one of 26 species of Euphorbia common to Florida. It can be found throughout the United States and even in southern Canada. On golf courses it is usually seen in weak turfgrass where nematode damage is present. It is so common to these areas, that it is often referred to as a nematode indicator plant.

There are several species of Euphorbia that are low growing prostrate forms similar in appearance to Spotted Spurge. Spotted Spurge can easily be identified from the others by its reddish spot or blotch in the center of its leaves. The slightly toothed leaves are attached opposite to each other on short petioles connected to hairy stems. Characteristic of Euphorbia species, the stems contain a milky latex juice that can be observed when the stem is broken.

Spotted spurge is a vigorous seed producer that germinates year around in tropical South Florida. The flowers are solitary or clustered with minute petals in the form of a cup.

The best control of spotted spurge is to cultivate a dense bermudagrass turf. Post-emergency herbicide control includes formulations of dicamba, 2, 4, -D plus dicamba, or bromoxynil. Preemergence control is possible with Simazine, but it is not a common type of control in Florida.

(Illustration from TURF MANAGEMENT FOR GOLF COURSES, Fall 1982, by James Beard, published by Burgess Publishing Co., Minneapolis, Minn., illustrated by Steve Batten)

GOLF TURF NEWS

BRUCE J. AUGUSTIN Extension Turf & Water Specialist AREC Ft. Lauderdale

Too Darn Much Seed

By CHARLES B. WHITE Southeastern Director USGA Green Section

The operation of overseeding bermudagrass greens has been outlined by probably hundreds of turf managers, educators, consultants, and maybe dog catchers. Rates range from 15 to 60 lbs./100 sq. ft. and methods are as varied as the people who overseed. In the next few paragraphs, I want to discuss some considerations for overseeding that have proven to work best in the field and why. After reading this, ask yourself: "Why do I overseed the way I do?" If you will take an objective look at your own operation, then a better one will result.

Let's first look at overseeding preparation. Preparation is not accomplished the week before overseeding application but is a grooming process over the entire spring, summer and early fall. Light, frequent topdressing, vertical mowing, brushing and/or combining improves putting quality and keeps turf with an upright growth habit allows the seeds to filter down to the soil instead of on thatch or foliage. This type of overseeding preparation eliminates the need for rigorous scalping and/or vertical mowing immediately before overseeding. We all know how detrimental this can be to the winter hardness of the bermudagrass.

The second consideration is seeding rates. Most articles about overseeding recommend 30 plus lbs. of perennial ryegrass per 1000 sq. ft. These rates, when properly groomed and fertilized like all greens should be, produce the most uniform and true surfaces and the best putting speeds. Texture and density are excellent and, best of all, transition is much smoother in the spring. Heavy overseeding CHARLES H. PEACOCK Extension Turf Specialist Gainesville

rates are expensive, encourage disease, are more detrimental to the bermudagrass, and are more difficult to eliminate in the spring.

The lighter rates provide all of the desirable characteristics of overseeding including bermudagrass protection. The 18 to 28 lbs./1000 sq. ft. selection is based on amounts of traffic and how quickly in the fall you wish the ryegrass to become dense. These rates, when brushed and groomed with the vertical mower in the spring, produce an excellent putting surface that allows the bermudagrass to rejuvenate its growth without a tremendous cool season canopy to shade it and compete with it.

These recommendations for overseeding rates, as mentioned, are based on observations from travel over the South. Many turf managers run into serious transition problems simply because they overseed too heavily. As we all know, overseeding quality and performance is more affected by management than rates anyway.

So now, when you are objectively studying your overseeding program, ask yourself: "Why do I overseed the way I do? Can I use less seed?" In most cases, the turf managers that say they can't use less than 30 lbs./1000 sq. ft. have never tried. Don't become caught up in the popular trends of heavy overseeding rates and lesser degrees of grooming. Remember, grooming and proper overseeding rates allow golfers to putt on the ends of the grass blades and not the sides. Who wants thick, grainy putting surfaces anyway?

Overseeding has been a tremendous asset to the playability of many golf courses by providing cool season covers for dormant bermudagrass. Overseeding protects as well as beautifies the course, but don't become a turf manager that uses "too darn much seed."



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THE MIRACLE OF THE SOIL

Soil consists principally of rock particles that have become broken down into smaller and smaller particles through processes of continuous disintegration and decomposition under the climatic forces of rainfall, varied temperature, wind and running water. The collection of these mineral-yielding rock particles, mixed with clay as a foundation, together with the decomposing remains of vegetable and animal life (humus), forms the basis of our productive soil.

The function of soil is to provide a secure anchorage for plants, and to provide all of the essential nutrient elements necessary to promote and to sustain plant and microbial life.

From the productive soil, there comes forth the only known form of chemically-created, selfaccumulating, self-supporting energy in the form of the living green plants. Plant life alone has the ability to accumulate and store chemical energy, which becomes the basic energy-food supply for the sustenance of all other forms of life.

By far the main elemental substance of plants, carbon, comes from carbon dioxide, which plants breathe in through their leaves from the air. The plants draw in water through their roots from the soil and circulate it upward through their structure. Much of the water so taken evaporates while keeping the leaves' interior surfaces moist for gaseous exchange with the atmosphere. The green coloring material of the leaves is a variety of chlorophyll, a very complex substance, each molecule of which is organized around one atom of magnesium.

This chlorophyll, which suggests corpuscles of "plant blood", has the remarkable ability of securing radiant energy from the sun and bringing about a chemical reaction between carbon dioxide and water to form a simple sugar called Glucose ($C_6 H_{12} O_6$). This is formed by the union of two duplicate chemical units, each consisting of three carbons and one phosphorus, uniting through the two phosphorus elements which drop out to form the six-carbon glucose. This simple sugar is in turn converted by the plant - in whole or in part - into starch and cellulose which form both the reserve plant food for cellular metabolism and the anatomical structure of the plant. It is a remarkable fact that we owe all of our food, fuel, and clothing to this wonderful chemical reaction.

Besides carbon dioxide, water, phosphorus, and magnesium the living plant depends for its

growth upon a number of other inorganic (mineral) food elements which must be present in the soil in such form that they can be absorbed through the roots of the plant and then circulated within the plant juices. Some of these elements are built directly into the plant structure as materials of construction while others, serving as tools, are catalysts that play an essential part in the chemical processes which promote the growth and development of the plant. In making our chemical analyses of plants, the former are plentiful - possibly quantitatively correlated with the soil's supply - and are readily measured with accuracy. The latter may have come - and gone - in only such small amounts which are called "trace elements".

Thus is seen the intricate pattern of life as it develops, - first through a process of chemicalization whereby carbon dioxide from the air and mineral nutrient elements from the soil are activated by energy from the sun and are thereby converted and stored as tissue-building and energy compounds in plants, then their subsequent conversion to a still higher form to become the tissue, blood, bone, sinew, and the special adornments of animal and human life.

The principle of life, whether microbe, plant or animal, is an eternal force of perfect, self-expressing, self-creating, self-supporting energy. Each form of life is limited to its own peculiar life cycle involving germination or conception, growth, reproduction, maturity and death. Barring accident, the only factor that can limit or prevent any form of life from completing its life cycle is starvation. Starvation may be caused from lack of sunshine and water, or it may be due to the absence of an otherwise adequate nutrient supply of a single one, or a combination, of the vital elements essential to plant and animal life.

When the pioneers first settled on our virgin soil, they found it firmly sewed to the earth by roots of trees and grass. When they cut down the forests and tore up the sod, this soil started down hill and has been going down ever since. This is because many of the essential plant food elements are not present in our soils in sufficient quantities to support annual crops indefinitely. Each harvested crop removes large quantities of these vital elements from the soil and, unless these elements are properly restored, soil depletion is the inevitable result. It is high time that we give consideration to conserving and restoring the vital elements to our soil. The mineral resources of our soil may be compared to a bank account which dinimishes with each withdrawal until finally we will be faced by "overdraft".

SOIL AND PLANT RELATIONSHIPS

In all soil management, the important consideration is the relationship between the soil and the plants that grow on it. Most of these points of relationship have to do with the needs of the plant for water, oxygen, and nutrients (plant food), hence we speak of "soil and plant nutrition".

The soil as a whole is a mixture of solids, liquids and gases (air). By far the greater part of the solid portion (approximately 90 to 98%) of the soil is represented by the inorganic (mineral) matter derived from the decomposition of rock. The solid rock and mineral particles range in size from stones and gravel, through sand and silt to clay. The texture or "feel" of the soil is determined by the proportion of particles of these different sizes.

BUT NO SOIL CAN BE A TRUE SOIL WITH-OUT ORGANIC MATTER. WHILE THE OR-GANIC MATTER MAY REPRESENT AS LITTLE AS 1% OF THE TOTAL SOLID MATTER OF A SANDY SOIL TO AS MUCH AS 8 TO 10% OF THE SOLID MATTER OF A RICH SILT LOAM SOIL, ITS PRESENCE IN THE SOIL IS ESSEN-TIAL TO MAINTAIN PROPER MICROBIAL ACT-IVITY. THIS ACTIVITY IS THE FORERUNNER AND ASSOCIATE OF THE ROOT ACTIVITIES OF PLANT GROWH. MICROBES ALWAYS EAT AT THE FIRST SITTING.

The living microscopic organisms that swarm in the soil, both fungi and bacteria, are the agencies that break down raw organic material into humus, and this again into simpler elements. They do this in the process of getting food for themselves and building up their own bodies. They in turn die by uncounted billions to further add to the soil's organic matter. Through this bacterial action, a favorable oxygen supply is maintained in the soil, and the productive capacity of the soil is, therefore, enhanced proportionately to the amount of organic matter supplied.

In general the fertility of virgin soils is associated with the continuous supply of organic matter which they receive from native vegetation, which is usually in balance with other factors. Since agricultural crops are generally removed instead of being left to decay, not enough raw material is added to the soil each year to maintain a natural balance. One result is a serious loss of nitrogen which is stored largely in the organic matter and released by decay. Another result is a serious change in the structure of the soil itself, which becomes less freely divided and compact as the amount of organic matter is decreased. Like nitrogen, the phosphorus and the sulfur are also stored in, and released by, decay of soil organic matter.

The first soil management problem, therefore, for any farmer to consider is that of maintaining the organic matter supply in his soil. Not only does the amount of organic matter decide the fertility level of his soil, but it also modifies the texture and structure of the soil itself. It is also important in regulating the "aliveness" of the soil through microbial action and regulates the water-holding capacity of the soil as well.

Return to the soil as much organic matter as you can in the way of manure, stalks, straw, stubble, etc. and practice green manuring whereever and whenever possible is the first recommended management practice.

ASIDE FROM THE GENERALLY IMPOR-TANT CONDITIONS CENTERED ABOUT THE SOIL ORGANIC MATTER, THERE ARE EIGHT PLANT FACTORS, NAMELY, (1) SEED, (2) LIGHT, (3) HEAT, (4) SOIL MOISTURE, (5) SOIL STRUC-TURE, (6) SOIL AIR, (7) SOIL FERTILITY AND (8) ABSENCE OF HAZARDOUS SOIL CONDITIONS. THE FIRST THREE ARE MATTERS NOT SIGNIF-ICANTLY RELATED TO THE SOIL, BUT THE OTHERS CAN BE SIGNIFICANTLY MODIFIED BY SOIL MANAGEMENT PRACTICES.

AN ADEQUATE WATER SUPPLY

The moisture content of the soil is an important factor controlling failure or success in crop production. This means that all dry farming operations center around the water supply. If ten inches of rainfall are required for any crop, nine inches may mean total failure, twelve inches — or two inches over the minimum — may mean a normal crop, while fourteen — or four inches over the minimum — may give twice as much yield as twelve inches.

In "dry farming" the precipitation (rain and snow) is the sole source of water supply and the proper conservation of this valuable asset becomes of prime importance. The water-supplying capacity of the soil is governed largely by the texture and structure of the soil itself and the depth to the underlying water table. The seasonal total water supply by precipitation is a meteorological matter dependent upon the climatic conditions.

SOIL WATER

Soil water occurs in three forms, designated as hygroscopic, gravitational and capillary.

A. Hygroscopic soil water is that water which is chemically bound in the soil constituents and is not available to plants. It represents that approximate 10% moisture still present in the soil after it has been air-dried.

B. Gravitational water is that water which normally drains downward out of the pore spaces of the soil after a rain. If drainage is poor, it is this water which causes such soil to be soggy and unproductive. C. Capillary water is the water which rises in the soil from the lower soil levels, possibly from the water table, much in the same way as kerosene rises in the wick to feed the flame of a kerosene lamp. It moves in any direction according to concentrations of water in the soil, hence moves toward the roots when they are lowering the concentration of water next to them. It is this water upon which plants must depend, principally, for their supply of moisture.

SOIL STRUCTURE MODIFIES SOIL TEXTURE AND SOIL CAPILLARITY

Because plants depend upon the capillary water in the soil as the principal source of moisture supply, it is important that the factors of soil structure and texture which contribute to the efficiency of the capillary action of the soil be developed and serve to the most efficient degree.

Medium textured loam and silt loam soils, because of their faster rate of movement of moisture downward during rainfall and later from lower depths to the root zone and the fact that they can bring up moisture from greater depths than either sand or clay soils, provide the best conditions of available, but not excessive, soil moisture for best results.

Low organic matter content and poor soil texture and structure are the limiting factors that reduce the efficiency of a soil's capillary capacity. The presence of a "plow sole compaction", dividing the subsoil and the top soil strata, is probably the most frequent obstruction found in soils to impede the normal movement of capillary water. This compaction layer, usually about one inch in thickness, is caused by the downward pressure of the plow when a soil is turned at the same depth year after year.

When such a compaction layer exists (usually found in the heavier, tight clay soils) the water from rains will soak into the ground only to the depth of this layer, with the remainder running off to be erosive. Because the surplus of water in such a soil cannot readily leach downward through the compaction layer, it leaves the soil soggy and un-aerated. At the same time in dry weather such a soil restricts the capillary water rising through this "compaction layer" and causes severe drought for the plants.

To correct a soil where the plow sole compaction layer (found in 50% of all samples tested) has become a limiting factor toward proper and efficient capillary action of a soil, several management practices may be employed to correct this condition, among them, subsoiling and the use of deep-rooted crops.

Any device whereby the compaction layer is broken up, permitting the gravitational water to move downward after a rain and permitting the capillary water to rise freely into the root zone in dry weather will make a great improvement in the soil's productive capacity. Many subsoiling devices are on the market and, when used intelligently, will represent an excellent investment. The use of a Graham-Hoeme Plow, just deep enough to break the compaction layer, has indicated doubling of crop yields in many cases. Subsoiling should be done when the ground is relatively dry. If done when the soil is wet, it often runs together again, producing little - if any - effect.

The use of such deep-rooted crops as sweet clover and alfalfa in the rotation will generally improve a soil's capillary capacity. This is because of their deep-rooted characteristics, often penetrating downward in the subsoil as much as three to ten feet. As their large and sturdy roots decay, the organic matter represented in these roots will serve as wicks for the capillary rise of water in the soil. Brome grass, which develops a very large and fibrous root system, sometimes penetrates as much as four feet and it, too, develops much organic matter in the soil and improves the soil structure as well.

Because water represents the most important mineral compound, physically and chemically, in the nutritional requirements of plants and animals, the provision of an ample water supply is of the greatest importance to a successful farming enterprise. Because of the very valuable services rendered by the U. S. Soil Conservation Service in assisting farmers with proper soil and water Conservation practices, we heartily recommend that you apply to your local County Soil Conservation Office for their services in assisting you in this most important engineering service.

THERE MUST BE ADEQUATE AERATION TO PERMIT THE DEVELOPMENT OF A GOOD ROOT SYSTEM AND AN ACTIVE MICROBIAL FLORA GIVEN TO OXIDATION OF MAINLY CARBON FOR ITS ENERGY.

Soil aeration is dependent largely upon the "tilth", that is, good structure, of the soil. The sizes and shapes of these structural groups, sometimes referred to as granules, and their resistance to breaking down in water make what is called the structure of the soil. Adequate areation and extensive root development come about because of good soil structure.

Sandy soils show little, if any, granulation due to the coarseness of their component particles. With soils containing a substantial percentage of clay, working them when wet results in destruction of the granular structure. Excessive tramping by livestock under like conditions is likely to have a similar effect. Sand soils are excessively aerated; clay soils are insufficiently so.

Alternate freezing and thawing, or wetting and drying, and penetration of the soil mass by plant roots are natural forces which favor the formation of soil particles or aggregates. Such aggregation is most highly developed in soils near neutrality in their reaction; both strongly acid and strongly alkaline soils tend to "run together" and lose their structural character. Tillage also tends to break down the structure of many soils.

Associated with both texture and structure is pore space, or porosity. These spaces may be large in the case of coarse, sandy soils or those with well developed granulation in silt loams. In heavy soils containing mostly finer clay particles, the pore spaces may be too small for plant roots or soil water to penetrate readily. Good farm soils have 40 to 60% of their bulk occupied with pore space, which may be filled with either water or air, neither of which can truly be said to be more important than the other.

Here, as in all other soil relationships, a satisfactory balance is important for productivity. Too much water slows the release of soil nitrogen, depletes mineral nutrients and otherwise hinders proper plant growth. Too much air speeds nitrogen release beyond the capacity of plants to utilize it and much of it is lost. The stored water in an over-aerated soil evaporates into the atmosphere and is lost to plants. Aeration, the exchange of soil air with atmosphere, capillary efficiency of water, microbial activities and other dynamics, by which the living soil is made productive, are improved by the good granular structure or good tilth of the soil. For this the decaying organic matter is a requisite.

THERE MUST BE A SUPPLY OF PLANT NUTRIENTS SUFFICIENT FOR PROFITABLE YIELDS.

Here proper soil management, guided by chemical tests, may be profoundly effective in ascertaining the true status of soil nutrients and in the practice of supplying them in such amounts as will correct the specific deficiencies to provide a balanced diet for crops of higher requirements and physiological complexities synthesizing products of higher nutritional values as feeds and foods.

Among the soil's deficiencies that affect productiveness, there is first that of organic matter in the broader nutritional values and activities of its unknown compounds serving directly and indirectly in plant nutrition. Then there are calcium (and magnesium), the alkaline earths, according to which soils are classified into the two major groups, the pedocals and the pedalfers, as partially and highly developed soils respectively according to varied geoclimatic settings. Ecologically these also represent producers or nonproducers, respectively, of protein-rich, nitrogenfixing leguminous vegetation by which soils have been built up in organic matter or are less so.

In soils with the organic matter in ample supply, the negative nutrient elements, or anions, namely nitrogen, sulfur and phosphorus, are usually better supplied and made more available by decay of that organic matter.

The positive nutrient elements, namely calcium, magnesium, potassium and sodium are held by the clay surface adsorption and retention within the different chemical structures of the different clays in varied geo-climatic settings. Those retained nutrient cations are, nevertheless, exchangeable to the plant roots for other cations, among which hydrogen is the most active one.

The trace elements, namely manganese, iron, copper, and zinc as cations and boron and molybdenum as anions, and possibly others, may fit also into the above behaviors as deficiencies via the organic matter or the clay.

Management of these nutrient essentials as elements or as compounds is the major control via the soil of crop production in respect to both quantity and quality in nutrititional values to man and his livestock.

THE SOIL MUST BE FREE FROM UNFAVOR-ABLE CHEMICAL CONDITIONS, SUCH AS EX-CESSIVE ACIDITY OR ALKALINITY, HARMFUL CONCENTRATIONS OF SALTS OR EXCESS OF CERTAIN ELEMENTS OR COMPOUNDS THAT CREATE UNBALANCED CONDITIONS FOR PLANTS.

Equally important as the organic matter supply, the water supply, the efficiency of soil aeration and the adequacy of nutrient elements in a soil there is the proper chemical balance of the soil. A soil that is over-saturated with the cationic elements, such as lime (100% Base Saturation at pH 7.00 and over) so that there is no active hydrogen in the soil, is undesirable as most plant nutrients function best when the soil is slightly acid, showing about 10% hydrogen saturation. In the complete absence of hydrogen, the availability to plants for such elements as phosphorus, manganese, iron, copper, zinc, boron and possibly others is severely restricted.

Similarly, when the hydrogen saturation in a soil exceeds 20% of its Total Exchange Capacity, it represents just that much inactive or un-used nutritive capacity. Besides, the excessive hydrogen saturation may severely restrict the proper growth of many crops because of the increased acid condition and thereby increased nutrient deficiencies that it promotes in the soil. The degree of acidity or alkalinity of a soil may be determined by its pH value and for best balance for the majority of crops grown a pH range between 6.0 and 6.5 has been found to be the most efficient. That pH is the result of proper balance of nutrient cations, among which the cation hydrogen from the soil is not included.

Similarly, when soils with poor leaching qualities such as the tight clay soils, or soils with a heavy plow sole compaction layer become oversaturated with such acid salts as sulphates and chlorides (which accumulate from heavy fertilized applications) the root development of many plants in such soils becomes severely affected.

The matter of a balanced chemical condition for your soils is, therefore, carefully studied and reported together with recommendations for their correction in your soils report.



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The Penalty of Leadership

In every field of human endeavor, he that is first must perpetually live in the white light of publicity. Whether the leadership be vested in a man or in a manufactured product, emulation and envy are ever at work. In art, in literature, in music, in industry, the reward and the punishment are always the same. The reward is widespread recognition; the punishment, fierce denial and detraction. When a man's work becomes a standard for the whole world, it also becomes a target for the shafts of the envious few. If his work be merely mediocre, he will be left severely alone — if he achieve a masterpiece, it will set a million tongues a-wagging. Jealousy does not protrude its forked tongue at the artist who produces a commonplace painting. Whatsoever you write, or paint, or play, or sing, or build, no one will strive to surpass or to slander you, unless your work be stamped with the seal of genius. Long, long after a great work or a good word has been done, those who are disappointed or envious continue to cry out that it cannot be done. Spiteful little voices in the domain of art were raised against our own Whistler as a mountebank, long after the big world had acclaimed him its greatest artistic genius. Multitudes flocked to Bayreuth to worship at the musical shrine of Wagner, while the little group of those whom he had dethroned and displaced argued angrily that he was no musician at all. The little world continued to protest that Fulton could never build a steamboat, while the big world flocked to the river banks to see his boat steam by. The leader is assailed because he is a leader, and the effort to equal him is merely added proof of that leadership. Failing to equal or to excel, the follower seeks to depreciate and to destroy - but only confirms once more the superiority of that which he strives to supplant.

There is nothing new in this. It is as old as the world and as old as the human passions — envy, fear, greed, ambition, and the desire to surpass. And it all avails nothing. If the leader truly, leads, he remains — the leader. Master-poet, master-painter, master-workman, each in his turn is assailed, and each holds his laurels through the ages. That which is good or great makes itself known, no matter how loud the clamor of denial. That which deserves to live — lives.

This text appeared as an advertisement in The Saturday Evening Post, January 2nd, in the year 1915. Copyright, Cadillac Motor Car Company D'Arcy—MacManus & Masius

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