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President's Message

On October 1, 1984 my term as President of the Florida Golf Course Superintendents Association ended. How quickly time goes by. It was a great honor and privilege to lead a unique association made of strong individuals. The experience of meeting and working along side very dedicated professional golf course superintendents has been very rewarding.

The past year was spent experimenting, reorganizing, and developing the long range future of our association. Our first time experiments were successful. Florida Golf Day raised \$13,000.00. The host superintendent recognition at tour events gave us much needed media exposure and our assertive management seminar was enthusiastically attended. These experiments will improve in the future. The reorganization and development of our long range future now has a direction. Programs that have begun are: A membership directory, newsletter published bi-monthly, job referrals, a modern professional golf course superintendent slide presentation and a more aggressive press release blitz on the media. Most of these programs were initiated by your new President, Mr. Tom Burrows. The keys needed to make these programs successful are communication and organization. Communication will depend on the board of directors and the membership. The organization will be handled by our first paid employee, Mrs. Angie Hiers, Executive Secretary. This was an aggressive step for an association with a four diget income.

I would like to recognize and congratulate John Hayden, C.G.C.S., who has served and represented the F.G.C.S.A. on the G.C.S.A.A. board of directors for three years. He helped the progression of not only superintendents in Florida, but throughout the country. John was the first Florida golf course superintendent to serve on the G.C.S.A.A. board of directors and did so admirably. Thank you John.

I would like to thank the board of directors of 1984 and the many individual members for their dedicated service during my term.

Hope to see many of you at the G.C.S.A.A. conference in Washington D.C. ■

President's Message

As stated in our by-laws, the purpose of the FGCSA is - To Promote Turf Management as it pertains to the Golf Course Superintendent and to unify the Golf Course Superintendents of the State of Florida.

During the past 7 years, the time and effort by FGCSA members to fulfill the organization's purpose has accomplished recognition by our own members, The Golf Course Superintendent's Association of America, The Florida Turf-Grass Association, The United States Golf Association, The University of Florida, The PGA, The LPGA, and our peers throughout the nation, as well as the golfing public.

Our thanks to all of those who have put forth their time and talent to accomplish the purpose of this organization.

We must continue to promote and protect ourselves, (No one else will do it for us). Your support and contribution (time and talent) are continually needed to further our progress.

Let's look at some of the accomplishments of the past 7 years.

Jan Surrous

<u>EQUAL REPRESENTATION</u> - Each Chapter Vice President is a director of the FGCSA. Four formal meetings are held annually, which are open to all members.

<u>GCSAA AND FTGA</u> - Both of these organizations now have our members on the following committees: Education, Public Relations, Research, Certification, Conference, By-Laws, and the FTGA Research Foundation.

<u>USGA</u> - A closer working relationship with the USGA now exists. A full-time agronomist is now employed by Florida. The annual Florida USGA Turf Conference has greatly improved and is one of our finest one day educational workshops available.

<u>IFAS</u> - We are recognized by IFAS as a fund producer, when we ask for research in a given area, or just ask for help from the University of Florida scientists, in most cases we get it.

We have FGCSA members on the Florida Agriculture Council and IFAS Advisory Committee. In the near future, we hope to have a member on the Pesticide Accessment Committee.

<u>ENVIRONMENTAL AFFAIRS</u> - We are now active in statewide affairs relating to golf courses. We have a member on the FTGA Legislative and South Florida Water Management District Committees.

We successfully participate in negotiations with the SFWMD concerning golf course water needs during periods of drought and restrictions.

<u>THE FLORIDA GREEN</u> - Our FGCSA quarterly magazine is proclaimed to be one of the finest golf course educational publications. It has won every National Award available.

<u>THE GREEN SHEET</u> - The recently established bi-monthly newsletter was created to produce communications between our 9 chapters.

<u>MEMBERSHIP DIRECTORY</u> - An annual directory will be available in your hands in January of each year. It contains the current roster of all chapters plus other valuable information.

EXECUTIVE SECRETARY - Angle Hiers was recently hired, part-time, to assist the Board of Directors with FGCSA secretarial work.

THE FGCSA Address is: 3715 Golf Road, Boynton Beach, Florida 33436 Phone (305) 732-6987

<u>PUBLIC RELATIONS COMMITTEE</u> was established to upgrade the Golf Course Superintendent's image and to concentrate on improving public awareness of Golf Course Management.

This committee attended 12 PGA/LPGA tournaments last year to provide information concerning course conditions, highlighting course maintenance procedures, along with information on the Golf Course Superintendent.

lso the committee has prepared a slide presentation that depicts the role of the modern Golf Course superintendent. This is available to all members.

MEMBERSHIP SERVICES - FGCSA Blue Blazers, Crests and Golf Shirts are available to all members.

<u>OUR EDUCATIONAL COMMITTEE</u> has put on two successful management seminars, sponsored by the GCSAA for Certification Credits. These seminars are open to all members.

<u>A JOB REFERRAL SERVICE</u> was recently established to benefit Golf Course Superintendents looking for positions and clubs looking for superintendents.

<u>MEMBERSHIP RECRUITING</u> - There are currently 425 superintendent members. Our Membership Committee is currently working on getting some of those 350 superintendents who are not members.

<u>GOLF</u> - We are represented at the GCSAA Annual Tournament by the FGCSA Golf Team. Members have qualified for the team by winning one of the FGCSA sponsored golf tournaments.

Our Golf Committee is currently working on a program to get every FGCSA member to establish a USGA Handicap. <u>FUND RAISING</u> - The Florida Golf Day, (A product of our Public Relations Committee) is a day proclaimed by Governor Graham to establish fund-raising activities for turf research and to stimulate interest in golf. Last year \$16,000.00 was collected.

Other FGCSA sponsored golf tournaments are: The Poa-Annua Classic, hosted by the Everglades Chapter and The Crowfoot Open, hosted by the Central Florida Chapter, The FTGA Scholarship and Research Tournament is also used as a FGCSA qualifying tournament.

North Florida Chapter To Focus On Member Needs

July 20th marked the 3rd Annual North Florida Golf Course Superintendent's Chapter meeting, election and golf tournament. Ponce De Leon Lodge and Country Club located in historic St. Augustine again served as our meeting and tournament site. Golf Course Superintendent, Dick Johnson, and staff did a tremendous job in preparing the course and helping chapter members and families feel right at home during the three day event. Superintendent Johnson obviously a hard worker and chapter membre recognizing this fact elected him president of the Chapter. The following newly elected officers and returning board members will aid Dick in his presidential term:

OFFICERS:

President - Dick Johnson, Ponce De Leon Lodge and Country Club, St. Augustine

Vice President - Tom Cowan, The Deerwood Club, Jacksonville

Secretary/Treasurer - Eddie Snipes, Selva Marina Country Club, Atlantic Beach

BOARD MEMBERS

Past President, Robby Robbins, Gainesville Golf and Country Club, Gainesville External Vice President (GCSAA Director), John P. Hayden, CGCS, San Jose Country Club

Frank Sabaro, Palatka Golf and Country Club, Palatka Linda P. Wainwright (newly appointed), Carter Seed and Fertilizer, Jacksonville

President Johnson and officers have set goals they feel can be attained in the 84-85 year.

1. To bring about greater member participation in Chapter structure.

2. Use local media and events to educate the area golfing community about our profession.

3. To develop better avenues of communication between members so that more knowledge can be shared.

4. To lend greater support to State and National organizations.

5. To develop a Chapter logo to bring together greater Chapter unity.

President Johnson has already planned a timely meeting for September 18 at the Ravines Resort. The program entitled, "Putting Poa Annua In Its Place", will bring together three Regional Technical Representatives from Rohm & Hass, Elanco, and PBI Gordon to help North Florida Superintendents deal with Poa Annua problems. Host superintendent for the meeting will be John Freeburn, former Assistant at Timuquana Country Club. Congratulations John!

The North Florida Golf Course Superintendent's Chapter is ready for the coming year and hopes to be productive for its members. Other chapters in the state are welcomed to attend our meetings and help us grow in our profession. ■



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A Closer Look At The New Grand Cypress Golf Club

By JOEL JACKSON

Tom Alex is a very busy young man. In fact, Tom has been busy since June 1983 when he became the Superintendent of the Grand Cypress Golf Club. Most of you know by now that the Grand Cypress Club is the new golf course that Jack Nicklaus has designed with a Scottish flair and a definite distinctive look quite different from other area courses. Ground clearing for the course began in February, 1982 in a 160 acre area of old citrus groves. The resulting sandy soil with some hardpan was blended and worked into a good mix that Tom says drains well even after some pretty hard rains. The only major problem during construction was the erosion on some of the plateau ledges and severe trap and mound faces from heavy rains which had to be reworked and backfilled. The course was planted with Tifdwarf greens and Tifdwarf II tees, fairways, and roughs. The unique sculpted, minialp-like mounds bordering each hole were seeded with Bahia grass and millet. The golf course opened for play on December 15, 1983.

Tom came to Grand Cypress after serving as an assistant Superintendent and acting Superintendent at the Tournament Players Club at Ponte Vedra, Florida. Before coming to Florida, Tom worked at Washington Golf Club in Washington, Connecticut after grduating from the Stockridge School of Agriculture at the University of Massachusetts in 1981 where he earned his degree in Turf Management. Tom is quick to praise his staff for the fine efforts they have made in grooming the course to its excellent condition. He is assisted by Sigrid Drew (landscape), David Pedersen (course maintenance), Wayne Pixley (head mechanic), and a crew of 26. Tom's staff is responsible for maintaining the 18 hole course, a 9 hole pitch and putt course at the Hyatt Regency Hotel, and the landscape around the clubhouse and north entrance complex.

Because of the small greens and tees, plateaued fairways, severe slopes and pot bunkers, a lot of handmowing is required. It takes four people two days to flymow all appropriate areas with part of a third day to touch up anything needed or missed. HF-5 hydraulic mowers are used on the fairways and roughs and mowable slopes.

Irrigation of the golf course is accomplished by two Varitime II Master Controllers with 88 satellites and 1,250 Toro valve-in-head sprinklers. The system is supplied by a combination of well and effluent water. Due to the sandy soil mix, Tom uses only slow release fertilizer at a rate of 1 lb. N per month on the fairways and 1 lb. N every 3 weeks on greens in the summer and $\frac{1}{2}$ lb. N during the winter supplemented with iron.

Speaking of winter, Tom had just overseeded his greens with a blend of 50% Poa Trivialis, 25% Red Top Bentgrass, and 25% Penneagle Creeping Bentgrass. The rest of the course except the mounds was seeded with ryegass. Tom is constantly working on those distinctive mounds to reach a relatively uniform 2 foot high grassy mound. To that end broad leaf weeds are selectively sprayed out and pre-emergent herbicides are used to protect surrounding turf areas from weed seed germination. Tom has had only a few instances of goose grass and soft crabgrass instrusion. This year he is going to try some wildflowers in those grassy mounds.

Last June Tom assumed responsibility for the landscape of the clubhouse and north entrance areas, and word is out that an additional 12 holes will be started this fall. Nine holes will be of regulation length differing from the original 18 by having more woods and water and less severe sloping and more easily mowable mounds. The other 3 holes, consisting of a Par 3, 4, and 5 will be used for golf instruction. In addition, Tom must provide some support for the construction of a railway that runs from the hotel to the clubhouse and is requiring relocation of some of the original irrigation system. Also, 50 villas to be started next year are planned between the first and third holes with four more phases possible in the future. Tom will be responsible for their landscaping. Like I said, Tom Alex is a very busy young man.

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Overseeding and Disease -Interactions?

CAROL P. MULLER-TURINA Graduate Research Assistant

T. ED FREEMAN Professor of Plant Pathology Plant Pathology Department

CHARLES H. PEACOCK Extension Turf Specialist IFAS, University of Florida

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Jacksonville 1741 Hamilton St. 32210 (904) 387-0516

11405 Rio Grande Avenue 32085 (305) 841-8460 The primary cool-season turfgrass used for overseeding is perennial ryegrass whether in blends or single cultivars. These grasses are applied at very high seeding rates and remain juvenile throughout the winter period under proper mowing heights for fine quality turf. It is a general belief that the new seedlings are highly vulnerable to diseases during establishment of the overseeding. However, fungicide dressings and more resistant cultivars have been able to minimize initial problems.

Current ideas about the interaction of overseeding and plant disease organisms led to the belief that the overseeding positively influenced the casual organisms involved in the disease. This would mean an increased chance of the disease becoming a serious problem on the dormant and actively growing turf. This increased disease incident is also linked to the aggressive nature of the overseeded grasses and base grasses resulting in an accumulation of thatch that would directly relate to increased disease incidence. However, contemporary putting green maintenance practices, including light and frequent topdressing, light vertical mowing, judicious use of nitrogen can help keep thatch to a minimum and alleviate many of the disease problems.

A study at the University of Florida, Gainesville documented disease organism population dynamics under overseeding conditions. Basically, the research was attempting to answer the question of whether or not the fungal disease organisms were increasing during overseeding. Specifically the study investigated the population dynamics of Pythium spp., Helminthosprorium-Curvularia spp., and Rhizoctonia spp. during the overseeding period (October-June) beneath swards of 'Tifgreen' bermudagrass overseeded with a blend of 'Marvelgreen Supreme" perennial ryegrass.

The research data yielded some interesting facts concerning the distribution and dynamics of fungal populations. Overseeding has little affect on the distribution of the fungal population vertically in the soil profile from a depth of 0 to 5 cm. The greatest numbers of fungal propagules were recorded from the top 2.5 cm where the thatch layer is present. There was a 10x difference in the fungal population from the 0 to 2.5 cm soil depth for *Rhizoctonia* spp.

Numbers of fungal propagules did vary between species and seasonally. The least number was detected for *Rhizoctonia* spp., regardless of whether they were pathogenic or saprophytic. *Pythium* spp. had intermediate numbers while the *Helminthosporium-Curvularia* complex had the highest counts. Increases in fungal populations is more noted in late winter and early spring necessitating more scrutiny by turf managers for detecting disease outbreaks.

Disease incidence was independent of overseeding vs. nonoverseeding indicating other factors are more important in prompting disease outbreaks. A well prepared plan of dethatching and monitoring for disease conditions including a thorough understanding of environmental conditions which may initiate a disease outbreak is vital to prevent problems.

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Arnold Palmer

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Leading Turf Equipment Company Is Opening Up Communications Within The Industry

(TAMPA, Florida, November 12, 1984—) DeBRA Turf and Industrial Equipment Company, the industry's leading equipment distributor, has become involved in a series of programs aimed at opening up communications between manufacturers, distributors, customers and students in the turf industry.

"No longer can an equipment dealer just sell equipment to customers and expect those cutomers to be satisfied," said M.J. Mclaughlin, general manager of the Tampa office of DeBRA. "Today, dealers have to understand customer's requirements in order to serve them properly."

And this understanding works two ways according to McLaughlin. "We not only have to learn about our customer's needs and problems, they need to learn from us as well.

"In the past, equipment was far more simple than today. Now machinery has become very specialized and complicated," reported McLaughlin. "It is necessary to educate our customers on this new machinery as well as educate ourselves on what problems this new equipment can present."

In order to increase communications between themselves and their customers, DeBRA is presently involved in several turf seminar programs.

A recent in-house service seminar in Tampa attracted more than 70 people according to McLaughlin.

"This is one way we can make purchasers more aware of what machinery is available and the proper use and servicing of that equipment. By making them more familiar with the equipment, we can ensure they choose the right machinery for their needs and help them avoid problems which might lead to unnecessary repairs."

Those in attendance heard talks on repair techniques, the proper use of turf machinery and equipment maintenance by personnel from DeBRA and Jacobsen, the world leading manufacturer in turf machinery. Tom Jochimsen, one of Jacobsen's leading service experts, was the featured speaker.

Hands on experience was also offered with access to newly introduced machinery so that paticipants could take a look at state-of-the-art turf maintenance equipment.

Plans are being made to hold a similar seminar in the Hollywood office which should attract nearly 200 participants.

DeBRA has also started a program in which they invite a customer to speak to the firm's employees on particular problems faced in the field. "We have invited golf course superintendents and other professionals to speak to our employees about what difficulties they run into when maintaining their properties," said McLaughlin. "By allowing our people to hear what problems customers have directly from the customers themselves, our employees will have a better understanding of how they can assist buyers," he continued.

One final program in which DeBRA is involved is the Annual Field Day and Dinner for seniors at Lake City Community College. We've been involved with the field day for nearly 10 years and look forward to many more.

The annual event, geared to those students in the turf program at the Community College, features equipment and representatives from co-sponsor Jacobsen Manufacturing Company. This allows students to see and learn about the latest turf machinery. A dinner in honor of the students is held the night before the field day.

"The students seem really pleased with the chance to see the equipment and talk to professionals from the industry," said McLaughlin. "It's a definite advantage for the seniors who are about to start their careers in this profession. We are proud to help them in this way.

"It's a definite advantage to the industry as a whole to create channels of communication within the profession," concluded McLaughlin. "We are pleased with our success and will continue our programs as long as they can be of use."





AGRICULTURAL SCIENCES UNIVERSITY OF FLORIDA

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GOLF TURF NEWS

BRUCE J. AUGUSTIN Extension Turf & Water Specialist AREC Ft. Lauderdale CHARLES H. PEACOCK Extension Turf Specialist Gainesville

A New Florida Statute Requiring Antisyphon Devices On All Irrigation Systems

A new statute (487.055) has recently been passed by the Florida legislature requiring the installation of antisyphon devices on all irrigation systems that inject chemicals into the irrigation water. This statute includes all golf courses that inject fertilizers into the irrigation system (fertigation). The Florida Irrigation Society and other groups have worked to make this a fair and equitable bill to help prevent ground water contamination.

All irrigation systems now under construction are required to incorporate an antisyphon device into the system immediately. All existing irrigation system have 18 months to install an antisyphon device.

The following is a copy of the new statute (487.055), definitions (487.021), and diagrams of the antisyphon device assemblies.

Section 17. Section 487.005, Florida Statutes, is created to read:

487.055 Antisyphon requirements for irrigation systems. -

(1) Any irrigation system used for the application of chemicals shall be equipped with an antisyphon device adequate to protect against contamination of the water supply, provided that an irrigation system installed prior to the effective date of this act shall be equipped with such device within 18 months from the effective date of this act.

(2) It shall be unlawful for any person to apply chemicals through an irrigation system which is not equipped with an antisyphon device as required by this section.

(3) The department shall establish specific requirements for antisyphon devices by rule. The department shall adopt such rules on or before November 1, 1984. (4) Any governmental agency requiring antisyphon devices on irrigation systems used for the application of chemicals shall use the specific antisyphon device requirements adopted by the department.

487.021 Definitions. —For the purpose of this chapter:

(7) "Antisyphon device" means a safety device used to prevent backflow of a mixture of water and chemicals into the new water supply.

(10) "Chemical" means any substance which is intentionally added to water for agricultural purposes.

(19) "Emergency exemption" means an exemption as authorized in Section 18 of the Federal Insecticide, Fungicide and Rodentcide Act.

(32) "Irrigation system" means any device or combination of devices having a hose, pipe, or other conduit which connects directly to any source of ground or surface water, through which water or a mixture of water and chemicals is drawn and applied for agricultural purposes. The term does not include any handheld hose sprayer or other similar device which is constructed so that an interruption in water flow automatically prevents any backflow to the water source.

5E-2.30 Antisyphon Requirements for Irrigation Systems

(1) Definitions

(a) The term "antisyphon device" means a safety device used to prevent backflow of a mixture of water and chemicals into the water supply.

(continued on page 19)

(continued from page 18)

(b) "Toxic Chemical" means any pesticide whose label bears the signal work "Danger" or "Poison".

(2) Antisyphon Device System, General. Any irrigation system designed or used for the application of chemicals shall be equipped with the following components:

(a) Functional check valve on the irrigation pipe. This valve shall be located in the irrigation supply line between the irrigation pump and the point of injection of chemicals. This valve, when installed, shall be on a horizontal plane and level. A deviation of not more than 10 degrees from the horizontal shall not be set.

(b) Low pressure drain. Such drain shall have an orifice size of at least ³/₄ inch diameter. It shall be located on the bottom of the horizontal pipe between the functional check valve and the irrigation pump. It must be level and must not extend beyond the inside surface of the bottom of the pipe as shown. (Example, Diagram 3). The outside opening of the drain shall be at least two (2) inches above grade.

(c) Vacuum breaker. A vacuum breaker shall be installed on the top of the horizontal pipe between the functional check valve and the irrigation pump and opposite to the low pressure drain. The vacuum breaker shall have an orifice size of at least $\frac{3}{4}$ inch diameter.

(d) Functional check valve on the chemical injection line. A check valve shall be installed on the chemical injection line. If injector pumps are used, they shall be installed so that when water flow ceases, the injector pumps will not operate. A method shall be provided for positive shut off of the chemical supply when the injection system is not in use.

(3) Antisyphon System, Specific:

(a) A single antisyphon device assembly (Example, Diagram 1) shall be used for those systems where non-toxic chemicals such as fertilizers will be injected.

(b) A double antisyphon device assembly as shown (Example, Diagram 2) shall be used for those systems where toxic chemicals will be injected. The functioning of each device in the double assembly system must be capable of being checked independently of each other to insure effectiveness of the system.

(4) Chemical Storage Tanks. Tanks shall be constructed and maintained in a manner to insure containment of the chemical and to prevent contamination.

(5) Variances.

(a) None of the antisyphon device components shall be altered in any manner which would render the antisyphon system inoperative or ineffective.

(b) AN IRRIGATION SYSTEM WHERE ONLY FER-TILIZER IS INJECTED INTO THE IRRIGATION PIPES AND WHERE SURFACE WATER IS THE ONLY WATER SOURCE, AND WHERE BOTH A CHECK

VALVE ON THE OUTPUT SIDE OF THE PUMP AND A FOOT VALVE AT WATER INTAKE IS PRESENT, WILL BE APPROVED AS A VARIANCE TO THE RULE.

(c) Specific variances of equipment not covered by this rule but which may be in compliance with this rule shall be considered on a case by case basis by the department.

(6) Maintenance. All check valves, low pressure drains and vacuum breakers shall be maintained free of corrosion or other build-up and operative at all times during operation of the system. Cleaning agents used exclusively to maintain or clean an irrigation system shall not be subject to the regulations provided for herein.

(7) PENALTY. ANY PERSON WHO SHALL USE ANY IRRIGATION SYSTEM FOR THE APPLICATION OF CHEMICALS, WITHOUT THE REQUIRED ANTI-SYPHON DEVICE INSTALLED OR WITHOUT THE ANTISYPHON DEVICE IN OPERATING CONDITION, SHALL BE SUBJECT TO AN ADMINISTRATIVE FINE NOT TO EXCEED \$1,000 FOR EACH VOILATION.

Specific Authority: 570.07(23) FS.: Laws of Florida, Ch. 84-388, Sec. 17 (Sec. 487.055(3) FS.)

Law Implemented: Laws of Florida, Ch. 84-388, Sec. 17 (Sec. 487.055 FS.) ■

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South Florida Sunshine



From Developer To Private Country Club

By KEN ANDERSEN

Many superientendents have asked me how working for a developer differs from working for a private country club. Having been employed as superientendent of a private country club and a developer, I have had the opportunity to see both sides of the fence.

Let me start with the developer. The developer I am talking about is the company (usually banks) who purchases a large amount of land, usually 500 to 1,000 acres, builds and maintains a golf course with all the fixings to go with it. This includes a pool, tennis corts, clubhouse, lounge, restaurant, etc. To make it attractive to home buyers who are looking for a country club atmosphere.

The developer is not in the golf course business but is in the business of breaking down the large amount of land purchased into single family home lots, condominiums, townhouses, etc. This is where the real profits can be found. Of course the developer does not want a poorly maintained golf course, but one that is inviting so they are willing to spend a considerable amount of money for landscaping common ground and for golf course maintenance.

The golf course superintendent is hired and usually answers to a project manager, not a clubhouse manager, nor a greens committee. This is a very important point. The superientendent does not have 300 to 400 members to answer to, or a greens committee, or a professional golfer. All negotiations for contract purposes, capital expenditures, budgets and problems are solved through the project manager. Now, let me say here, there are always exceptions but from my experience and talking with other superintendents in the same position, they all have similar circumstances. In my particular case all beefs, large or small were directed to the project manager before handed to the superintendent. The project manager would discuss with me any changes, additions or subtractions to the golf course.

Well, so far many of you private country club superintendents and others are probably saying, gee that is the type of situation I want to be in. There is one drawback, eventually the 300-400 members to be, or whatever the particular club can accommodate, will own and operate the golf course. This may be two years, it could be ten years, in my case it was six years. All of a sudden you have 300-400 bosses who think they know all there is to know about running a golf course. I call them sidewalk superintendents.

I personally felt much more secure discussing turf management with one project manager. You could build a good close relationship with him and feet at home discussing problems or projects. When discussing problems with a greens committee all it takes is one person who doesn't like the way you comb your hair or thinks he knows a little bit more than you about running a golf course. This is where your problems can start. You go home that evening and think about how to get that man to understand what your intentions are. You finally figure it out and the next day another board member disagrees with another point you have made or suggests we do it this way and not the way you have been doing something successfully for years. It then can snowball where you start second guessing yourself, lose confidence and your game plan is disrupted.

In my particular case a committee was appointed prior to the takeover. Well, almost immediately there were committee members walking through the premises taking notes, asking questions and observing every move the superintendent or his employees made. I even had a committee member greet me at 5:50 A.M. to ask me some questions. It was at this point I asked myself, "Do I really want to work under these conditions?" Well I cooled off after a few days and thought, O.K. after all they are going to own the club and they have a right to see how we operate. Up to this point even though I was answering to a project manager, I knew if I were to continue on as superintendent I would have to meet some if not all their demands. This turned out to be the most difficult time for me. If the members wanted a sand trap put in and the project manager did not, I would be caught in the middle of the line of fire. This is only one example, there were many more. O.K., enough of that. Next a letter was sent to all department heads (superintendent, pro, manager, etc.) as to the committee making a decision to keep or replace each particular position. I thought this would be good because the decision would be made by June 30, 1984 and the members would not take over until December 1, 1984. This gave me five months to search for a position in the event the committee chose to replace me. (continued on page 22)

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6" round box



(continued from page 20)

Unfortunately it did not turn out this way. Other than general disucssions with the board members, my case was not brought up until August. During this month we had agreed on a contract and I received a hand shake, a pat on the back and a welcome aboard singal when leaving the table. After negotiating with the greens chairman, I knew I had my work cut out for me but I accepted this responsibility. Two weeks later I was informed that the greens committee decided to make a change. Shocked, confused and in a bit of a daze looking back I can see that many of the key people were making top salaries, including myself and were all replaced with lower wages. I might add it was not only the key people but employees who were in service for quite some time and making more than your usual dish washer, chef's helper or waitress. The last count of employees went from 210 to 140, in less than 2 months. As you all know private country clubs are a non profit organization and the majority of them raise annual dues or assess each member when money is needed. Historically my particular club was taking a loss each year. I am sure this is what the new members had to take a long hard look at. I do not feel it had anything to do with the particular employees capabilities but was prompted by one bottom line, the budget.

The legal takeover is December 1, 1984 but the members convinced the developer to allow their changes to be made before that time to create a smoother transition period. I think the thing that hurt me the most was the confidence I had in doing my job. I had been working with a popular agronomic consultant and receiving favorable reports, a newsletter from the committee had indicated the membership liked what I was doing and expressed their support and yet, without notice, I am presently looking for another position.



"More Than Just A Picture"

By MIKE BAILEY

This is the third of a three part series dealing with the art of photography. The first of the series delt with the aspects of needing an above average camera to capture a great photograph. The second delt with the basics of photography. This final chapter is primarily directed towards various concepts, equipment and techniques aimed for an advanced photographer. By the end of this chapter we will evaluate many items that can greatly aid your ability towards taking exceptional photographs. Just like in golf, you can have all the fancy equipment available but, if you cannot play the game or capture the scene, your efforts in both events will fail.

The first criteria that distinguishes a novice from pro is the photographers' lack of concern to take many pictures in order to get that extra special photo. The cost of film is the least expensive element for this science. Quite often I find a situation that I might not ever get to see again, so I will not be bashful to crank out an entire roll of film in the matter of just a few minutes. A photographers' general rule is to take as many pictures as deemed fit, in order to insure that at least one of various pictures of different composition, shutter speed, operative setting and fine focusing is exactly the one that the boss wants.

Even if you do not plan to take a great deal of pictures over a long period of time, you can still try this tip to save some cost on film. New York mail order photography shops sell "fresh", factory packed Kodak film at a substantial savings, when buying quantities of 10 or more, as compared to local discount stores. Upon arrival of your mail order film, to help keep fresh until the stated expiration date stamped on the side of the box, simply store the film in your refrigerator (not the freezer) until needed. Allow film to warm up to room temperature and you're ready to shoot.

Lets continue further about the care of your film. Realizing that film is a very thin layer of plastic where upon the negative will ultimately produce your photograph, we must exercise extreme care to ensure a quality photograph. First off, we can all relate to a conditioned environment when dealing with plants, well, this also holds true for your photographic equipment and film. Never expose the camera or film to extreme heat, such as the dash of a car or even the trunk. Always try to keep the camera away from direct sunlight. When on a trip here is another tip to be aware of. Airports and other security systems that use x-ray metal detectors can prove to be fatal to your pictures. True, the security personel and all the posted signs claim the detectors will not damage your pictures, however the fact is: An accumulative build up of 5 or more exposures can begin to fog your film. Always have your gadget bag checked by hand and passed around the detectors. To expediate matters, have all (continued on page 23)

(continued from page 22)

zippers, pouches and lense caps open for viewing. Familiarize your procedure to dismount the lense from the camera body to prove all your paraphernalia is legit. There is one precaution that you can exercise to eliminate all such fears of exposure by purchasing an x-ray proof metal lined film storage bag. Place all of your film in such before your departure and you can be safe from any such contamination.

Now that we have evaluated all the precautions to exercise before you take your picture - what about the here after; the people you must trust to develope your pictures, let it be known this is where the professionals really come into play. You basically get what you pay for. Kodak is not the largest developer by chance. Film developing is truely a science whereby chemicals must be kept to within one degree fahrenheit varience for consistency of developing. Chemicals must be kept fresh and of proper concentrations. The negative tells all. If poorly developed, scratched or other wise damaged. forget it! The damage will never go away. Once you hand your canister over the counter to be developed, they control your films' destiny. Another item to consider, if, for any reason, they lose your film or other liabilities incur, your only recourse shall be that they will gladly give you another roll of film to try again, for this reason, when photographing important matters I will shoot more than just one roll. There are many companies offering good service, however, I cannot afford to take the chance and I go with Kodak. Can you? Once you get your slide pictures back, remember that you are still dealing with delicate material. Store in a dark, cool, dry place. The sun can fade the intensity of pictures while humidity can allow fungus to form. Preventative measures taken will obviously prolong the life of your pictures and your gear.

We are now beginning to indulge upon the fact that photography can be a hobby whereby we take pictures seriously. I believe there is really little difference between the degree of an advaced amateur and a professional photogrpher. There are many accesories that one begins to contemplate purchasing. The last time I bought a new camera, my specific purpose of changing cameras was for the reason of wanting a motor drive (a device that attaches to the body of the camera to automatically advance the film without the need of manually advancing the film). A motor drive can crank as many as 6 frames per second (depending on the manufacturer and model).

Action photography, such as photographing a golfer just at impact is one example of just how valuable a motor drive can be; especially when you compare trying to catch the precise action by just guessing and pushing the button. One must be willing to pay the consequences, however, with a motor drive, one can crank out a 36 exposure roll of film in just six seconds! Even if you never plan to take action shots, I still believe you will enjoy the ease of a motor drive. My Nikon motor has an automatic shut off to eliminate battery drain. I totally eliminate the need of worrying if the film has been advanced for a take. The motor can be set into the single mode (advances 1 frame per push of the button) whereby with every shot I just push the button and voila. I have become so attached to the convenience of a motor, it feels rather primative when I manually advance the film. The primary benefit of



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(continued from page 23)

the motor however is the fact of simplicity — one less item to distract from my ablity to concentrate on the subject.

One of the most aggravating situations that can occur to an amateur photographer is to own a relatively good system but fail to take adequate pictures under adverse conditions. A flash unit will obviously reduce the fear of underexposed pictures, however, there are other items to consider as standard equipment. One must decide when does the time arise for the need of a tripod. In a situation involving photograph portraits, slow speed stills, slow speed action pans or a group of photos to be taken from one specific location, a tripod becomes necessary. There is one simple relief when buying a tripod: You get what you pay for. You can buy an inexpensive "toy" tripod for less than \$50.00, however, the quality is seldom good enough to produce a solid base for steady pictures. After having bought two "toy" tripods, I eventually bought a "real" tripod. One that is strong, sturdy, heavy and basically strong enough that I can stand on it. Costs will be well over \$100.00 but I have now finally made a purchase that will never need to be upgraded. The features of setting to eye height, adjustment for verticals, horizontals and panning are made of metal knobs and braces that shall last for a long time, if taken care of.

Now that we have evaluated the purchase of such items as tripods, motor drives and flash attachments it becomes evident that photographers can become very involved with gadgetry. Yes, there are even more items to consider. Facts are that a motor drive requires 6 AA batteries and a flash will require 4 AA batteries not to mention a back up set for each. You now have purchased 20 AA batteries. You have reached a point where rechargeable batteries and 2 charges are well worth the investment. The most important consideration is the fact that the night before you shoot, you can recharge your batteries to their potential rather than assuming your old batteries will hold for one more take.

One last basic accessory to consider as standard equipment would be the use of more filters. As mentioned in the first article, a UV filter is a good filter for protecting the front glass elements of your lenses, however what about a more useful filter. If one takes outdoor color pictures, a polarizing filter will provide beneficial improvements. Remember those sunglass commercials which cut out the glare so you can see better? Much the same is true for your camera. A polarizing filter will definitely reduce glare whereby richer colors will be revealed. Blue skies will become bluer, white clouds more pronounced and the green grass even greener. Yes, leaf blades are shiny and also reflect glare, whereby the polarizing filter will filter out reflected waves and the turf grass will actually appear greener! The filter threads to the front of the lens barrel, rotating the filter 90° in either direction will produce the optimal effect. There is one drawback to this phenomena. The filter reduces light penetration, so plan accordingly.

We have now just about reached the end of the line as for all the fancy gadgetry that we should seriously consider for the advanced amateur. You now should have all the equipment needed to take that "Perfect Picture". To be a failure now would be much like dressing up in your fancy duds along with your shiny new clubs (not to mention your name plastered on the side of a big pro bag) only to proceed to the first tee and shank your tee shot.

Lets review some techniques that can prove helpful. Learn to become familiar with the speed (ASA) of your film so that you are appreciative of light intensities relating to shutter speeds and operative settings. Try to capture pictures with clean, simple well composed precisely focussed subject matter, that is of primary concern. Never take a photo with confusing subject matter or your photo will be undefined and look much like a plate of spaghetti. Don't be bashful about taking a few extra pictures to increase your guarantee of getting a good one. If all of your pictures don't come out perfect - don't become discouraged, profit by your mistakes. Learn what you did wrong so you can minimize your mistakes. You should now have the potential to photograph just about any type of subject matter under just about any type of situation Whether the subject is brightly or darkly lit, fast or slow moving, colorful or bland, into the suns' glare, hand held or on a tripod, one photo, or via the means of multiple shots with a motor drive and best of all you are in control of the camera. Go at it. Take good care of your system and you will have good photos to cherish for years to come and someday maybe your grandchildren will ask, "were you a professional photographer way back when?



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The Gator Growls

Venomous Insects: They May Be Hazardous To Your Health

By SANDRA P. CARMOUCHE

Imagine that it is late spring and you are making an early morning inspection of your golf course via golf cart. As you round number eight tee your attention is drawn to Jim, one of your employees, who is pruning myrtle bushes in the rough.

Suddenly Jim drops his pruning shears and begins to run while his arms flail the air. You drive over and he tells you that he bothered a swarm of bees and got stung on the forearm.

Jim assures you that he is alright, but before you leave there are a few bushes you want to point out that need special attention.

As you talk, you notice that Jim is having trouble catching his breath. He frequently wipes his eyes, which look red and watery, and says he is feeling weird, sort of weak and dizzy. You tell him to get in the golf cart and you will take him to the maintenance building.

Halfway there, Jim grabs his stomach and doubles over. His voice sounds raspy and his speech is slurred as he complains of nausea and cramps.

By the time you reach the maintenance building, Jim is nearly unconscious and his skin tone is becoming gray. You call for emergency assistance, but it looks as of Jim might die before help arrives. What can you do?

First, you need to know what you are dealing with. Jim is suffering from anaphylactic shock, the severest form of an allergic reaction to insect venom.

Although there are no exact statistics on the number of people allergic to venomous insects (some estimate it to be between four and eight people in 1000), the number is small. But because golf course personnel are frequently exposed to insect habitats, it is important that a golf course superintendent know something about the effects of stinging and biting insects and what to do in case of an emergency.

According to Seth Schurman, M.D., P.A., an allergist with offices in Fort Myers and Naples, Florida, there are between 90 and 100 deaths recorded each year in the United States as a result of insect stings and bites. But Dr. Schurman says the figures are understated since they represent only those cases reported to health departments. And occasionally death occurs so quickly, sometimes in seconds, that the site of the injury has no time to swell or become inflamed. Consequently, unless the attending physician is alerted to the possibility of insect venom being involved, the cause of death may be recorded as something different.

Because symptoms of allergic reactions to insect venom can be confusing, the ability to recognize them could mean the difference between life and death.

• Mild Symptoms: swelling of two or more joints (for instance, a sting on the forearm produces swelling in the wrist and elbow), itchy eyes, dry cough, hives or rash, a constricted feeling in the chest or throat, wheezing, nausea, vomiting, abdominal pain, dizziness

• Severe Symptoms: difficulty in breathing, hoarseness, slurred speech, difficulty in swallowing, confusion, a sense of doom

• Anaphylactic Shock: cyanosis (skin tone becomes gray or blue from lack of oxygen), reduced blood pressure, incontinence, unconsciousness, death

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The most important thing to remember is that symptoms can escalate from the mild to the severe in a matter of minutes. The first sign of trouble following an insect sting or bite should be treated as an emergency and medical attention should be sought immediately.

Although it is possible, it is doubtful that a person who knows he is allergic to venomous insects would consider a position in the field of golf course maintenance. The risks are too substantial. Unfortunately, for several reasons, not everyone who is allergic to insect venom knows it.

Before a person can exhibit an allergic reaction to anything, he must first be sensitized. In other words, an individual must have had previous contact with an allergen (the substance that induces allergy) before he can react. Frequently, there are no signs of an allergic reaction upon first contact with an allergen so the individual has no reason to believe he is allergic.

Also, according to Dr. Schurman, studies at the Johns Hopkins University in Baltimore, Maryland indicate that an allergic individual will become desensitized to insect allergens over a period of 10 years, provided there is no contact with them during that period. For example, a person is stung by a wasp when he is five years old and again 20 years later. On neither occasion did he exhibit an allergic reaction. Yet when he is stung by a wasp at the age of 27, he experiences a severe reaction.

There is no method at present for predetermining how severe a reaction will be. The degree of sensitivity varies from one person to the next and the amount of venom injected into the skin can become a factor, particularly where multiple stings and bites are concerned. Also, insect venom is more potent during the breeding season than it is at other times of the year.

Since 1978, allergists have successfully used a longterm treatment called hyposensitization against allergies to the honey bee, yellow jacket, yellow hornet, white-faced hornet, wasp, and, to a lesser extent, the fire ant. Injections of the venom that the individual is allergic to are administered in doses that increase over a period of time until the person becomes tolerant, or desensitized, to the venom. In terms of preventing fatal reactions, the treatment is 100% effective.

Unfortunately, hyposensitization is not as successful in treating allergies to other venomous insects, such as the mosquito or the deer fly. The individual who is allergic to these insects must rely on an insect sting kit to avoid disaster.

Insect sting kits all contain the drug epinephrine, usually pre-measured and pre-loaded into a syringe, which stabilizes the individual long enough to reach a hospital.

The problem with the kit is that it must be carried on the person at all times and the hypersensitive individual may become unconscious before he has a chance to inject himself. Also, Dr. Schurman cautions against being lulled into a false sense of security. The symptoms of an allergic reaction can completely disappear after the use of epinephrine. But once the effects of the drug wear off, the symptoms can recur with deadly results. It is imperative that a person get to a hospital, even though he has injected himself with epinephrine and feels fine.

Should an emergency situation arise and there is no epinephrine available, there are several other things that can be done for the individual experiencing an allergic reaction.

• If a stinger is imbedded in the skin, brush or scrape it out (the bee's venom sac is attached to the stinger and grabbing or squeezing the skin around it will force more venom into the skin).

• Apply ice to slow absorption of the venom to other parts of the body.

• Apply a tourniquet above the site of the sting or bite (remember to loosen the tourniquet every three to five minutes).

• Since so many golf courses are located a good distance from any hospitals, and because time is such an important factor, it would be best to call an emergency vehicle for help. They all carry epinephrine and will probably be able to reach you in less time than you could reach a hospital.

• Should it become necessary, cardio-pulmonary resuscitation may prolong life long enough for help to arrive.

Obviously, the best treatment for allergic reactions is their prevention. The allergic individual, as well as the non-allergic person, can benefit from the following precautions.

• Don't wear perfumes, colognes, sun tan products, or anything that has a sweet odor.

- Wear khaki, white, or tan-colored clothing as opposed to flowery or bright clothing.
- Never go barefoot and don't wear sandals. Yellow jackets build their nests in the ground.
- Use caution around flower beds, garbage cans, and anything else that emits a sweet odor.
- Don't eat or drink outside. Not only does it attract insects, there have been occasions when an insect has flown into a can of soda and been swallowed.
- Exterminate nests and hives.

• If contact with insects is imminent, don't make jerky movements or swat at the insects. It can incite them to sting.

• Individuals who are allergic to insect venom should wear medic alert tags.

(continued on page 29)

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Sulfur has been recognized as one of the many elements required for plant growth for nearly 130 years. Deficiencies of this plant nutrient were identified as early as 1900 on certain soils in the Pacific Northwestern states. In Canada, this deficiency was first discovered in 1927 on some soils in Alberta. In spite of these early records of the need for sulfur, it has received only limited attention until quite recently.

Interest in sulfur as a plant nutrient has increased greatly in the past few years, partly because reports of sulfur deficiency throughout the world are becoming more frequent and extensive. The main reason for greater occurrence of sulfur deficiencies are:

1. Increased use of high analysis, essentially sulfurfree fertilizers.

2. Decreased use of sulfur as a fungicide and insecticide.

3. Increased crop yields which require larger amounts of all of the essential plant nutrients.

4. Increased consumption of low sulfur fuels and increased emphasis on control of air pollution.

5. Increased ability to identify soils low in sulfur.

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4. The formation of the glucoside oils found in onions, garlic and crucuferous plants.

5. The formation of certain disulphide linkages which are associated with the structural characteristics of protoplasm. The concentration of phydril (-SH) groups in plant tissues has also been shown to be related to increased cold resistance in some species. Sulfur was recently shown to be present in the nitrogenase enzyme which is involved in the fixation of nitrogen by microorganisms. In certain situations free living nitrogen-fixing organisms in the soil and the nodule bacteria in legumes will make significant contributions to the nitrogen supply in soils.

Nitrogen and sulfur requirements are closely linked because both are required for protein synthesis. Plant protein contains about 1% S and 17% N. The need for sulfur fertilization often depends upon the supply on N and other nutrients and fertilizations at high rates with these elements may induce a sulfur deficiency.

Why is sulfur important? In the absence of sulfur, turfgrass exhibits a chlorosis that frequently occurs as an intense yellow color. In mild cases one may think of nitrogen deficiency or even iron deficiency. On the positive side, we find that sulfur enhances color, density and growth. There seems to be a direct relationship with nitrogen. The turfgrass fertilized with the higher quantities of nitrogen show increased response to sulfur. It has been reported that when 12 pounds of nitrogen are used, there is a requirement for 8 pounds of potassium oxide and 3.45 pounds of sulfur.

The net effects of adequate sulfur in combination with N, P and K are several:

1. Better decomposition of residues (thatch)

2. Stimulation of soil microorganisms.

3. Improved color, density and composition of turfgrass.

4. Greater drought tolerance.

5. Improved winter hardiness.

Well-documented studies by Goss, Gould and others in the Pacific Northwest reveal some very convincing reasons for applying sulfur along with nitrogen, phosphorus and potassium. Adequate sulfur reduced Fusarium patch in turfgrass by 86%.

This property of controlling disease really should cause no great surprise because we have known this about sulfur for a long time. The surprising thing is that so many of us have not put the knowledge to use.

Another turfgrass disease that has been checked and controlled to a large degree with sulfur is *Ophiobolus* patch.

When Merion Kentucky bluegrass is short of sulfur, it is much more susceptible to powdery mildew.

Dollarspot fungus in warm-season grasses in Florida was reduced by the use of sulfur in fertilizers. This may be a bit hard for many to believe, but data from the Pacific N.W. showed that the adequate sulfur prevented *Poa annua* from infesting bentgrass turf. At the same time the blue-green algae was reduced significantly.

Perhaps some of the advantages found in using adequate sulfur come from the fact that turf is rendered more vigorous, an obvious sign of healthier grass. Healthy turf resists injuries and recovers faster when injury occurs.

Basics Of Calibration

By DR. STANLEY R. SWIER Extension Specialist/Entomology University of New Hampshire

Every now and then, everyone needs to review the basics. We all forget, especially when there is so much we need to know about our jobs. Before I came to the University of New Hampshire, I taught a course in Turf Pest Control at the Agricultural Technical Institute, Ohio

(continued on page D)

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(continued from page B)

State University. While teaching two-year turf grass majors, I developed a fact sheet on the basics of turf calibration. I would like to share this information with you. Improper calibration may be responsible for much of our poor pest control. It is also very costly. This information will help you measure the area of your green and fairways and help you quickly calibrate your equipment.

MEASURING GREENS:

- 1. Cut a piece of plywood 3 x 3', and with a proctractor and magic marker, draw 36 lines at 10 degree intervals from center to edge of board.
- 2. Drive a spike through center of board, and place board approximately in center of green.
- 3. With another man and a 100' tape, measure distance from center of board to edge of green (or collar) at 10 degree intervals. You'll have 36 measurements for each green.
- 4. Add these 36 figures together and divide the total by 36 to get the average radius of the green.
- 5. Area of the circle = πr^2 .

MEASURING FAIRWAYS:

- 1. You'll need a rollatape, a Cushman, and about four hours of time to measure your fairways.
- 2. Drive across a fairway and measure this distance, and do this every 30 yards or so up the fairway. Add all these figures together and divide by the number of figures to get the average width.
- 3. Measure distance from start of fairway to front of green.
- 4. Multiply average width by length to get area.

CALIBRATION OF SMALL SPREADERS:

- Check information on fertilizer bag for manufacturer's recommended setting, and begin at this setting.
- 2. Compute amount of material you want to apply per 1000 sq. ft. For example, a 20-0-0 material yields 1 lb. of actual N for every 5 lbs. of material applied.
- 3. Weight the amount of material that you have computed, and put this amount in the spreader.
- 4. Mark an area 20 x 50 feet with paint on blacktop or with stakes on grass.
- 5. Apply material at normal walking speed if after covering the 1000 sq. ft. you have material remaining in spreader, increase setting by a little and conversely if you ran out of material before finishing the 1000 sq. ft.
- 6. Write down spreader setting in your records for future reference.
- 7. NEVER fill a spreader on a green or tee use a nearby cart path or area out of play. You may just break a bag or overfill your spreader.
- 8. When fertilizing greens and tees, don't fill your spreader completely full unless you can empty the contents on a green or nearby tee. If you can't empty the spreader, you'll just have to lift that extra-heavy spreader into the back of a Cushman, and there's also the chances that you may upset this top-heavy spreader while in transport.

CALIBRATION OF BIG SPREADERS:

- 1. Again, check information on bag for manufacturer's recommended setting, and set spreader at this setting.
- 2. With a big spreader, you have to know:
- a) spreading width of spreader (this varies with material)

b) speed of tractor in feet per minute

$$3 \text{ mph} = 3 \times 5280 = 264 \text{ fpm}$$

4 mph = 352 fpm

- 3. choose your tractor speed (no more than 4 mph), measure the width of spread, and calculate the number of sq. ft. that will be covered in one minute. For example, 4 mph x 20 ft. spread = 7040 sq. ft.
- 4. Compute the amount of material that you want to spread on 7000 sq. ft., and then spread it. If it takes longer or shorter than one minute to empty the spreader, adjust the spreader opening accordingly.
- 5. Again, record this spreader setting for future reference.
- 6. Hint for computing your fairway fertilizer and fungicide requirement: if you have measured your fairways and have a total of 33 acres for example, base all calculations on 40 acres due to overlap and to overflow into rough. You won't be caught short at the end of the season if you give yourself a little fudge factor.

CALIBRATION OF HANDGUN:

- 1. Measure amount of water that is pumped through handgun in one minute.
- 2. At your normal spraying speed, time how long it takes you to spray 100 sq. ft. Repeat this twice and take the average.
- 3. Simple mathematics will determine how many acres (or 100 sq. ft.) that you can spray per tank.
- 4. Remember that every man will have a different spraying speed, thus calibration will vary from man to man.

CALIBRATION OF BOOM SPRAYER:

- 1. Fill sprayer one-half full or so of water (no fungicides yet), and set the operating pressure you desire. The lower the pressure, the less the mist and the more acreage per tank.
- 2. Collect the amount of water pumped through one of the nozzles in one minute. Repeat this at three nozzles along the boom and take average.
- 3. Plug this number into the following formula:

$GPA = 5940 \times GPM$

MPH x W*

*where W is nozzle spacing (in boom spraying) or spray swath (in boomless spraying) in inches.

 Another helpful hint here is to obtain a gallonsper-acre chart that lists all sizes of nozzles. Not only can you check your calibration, but when you change tip size, you don't have to calibrate again just refer to the chart and work out a ratio. ■

Pesticide Poisoning —Two Case Histories

By LYNN GRIFFITH

Part of working as an agricultural consultant and laboratory representative involves dealing with farmers, growers, and superintendents on a one to one basis, every day. Dealing with these agricultural professionals in such an intimate manner gives you insight into grower's thought, experience and opinions on a number of things. This year two of my clients developed pesticide poisoning in separate incidents. The nature of their experiences and their similarities is quite startling, as is the way the poisoning affected their outlook on chemicals, agriculture, and the environment.

The victims were both educated, experienced people, one a grower/manager, one a farm owner. The chemicals were different, but both were granular organophosphates. One victim worked in a wholesale nursery, the other in commercial turf. Both were more than happy to consent to interviews, and were glad that someone was telling their story in a professional, agriculturalist manner without media sensationalism. For the sake on anonymity, I will call the victim John #1 and John #2.

(continued from page 28)

- Golf course superintendents should screen job applicants for allergies (people who are allergic to one type of insect venom are often allergic to others).
- A golf course superintendent should familiarize himself with those golfers who are allergic to insect venom and who are members of, or regularly play, the golf course where he is employed.

Since there are so few individuals who are allergic to insect venom, it is unlikely that golf course personnel will ever have to deal with a crisis such as the hypothetical Jim presented. But because the potential is present, the individual who can recognize the symptoms and act swiftly may save a life.



Early one morning, John #1 was applying a granular pesticide to container nursery plants. It was hot, and there was little ventilation. He was wearing rubber gloves and a spray mask, but no arm cover. Apparently the material was absorbed through the skin on John's arms.

About 15 minutes after application, he started feeling nauseous, followed by profuse sweating and stomach cramps. Partial loss of vision occurred, followed by severe vomiting and diarrhea. The stomach cramps left him doubled over, virtually unable to move.

Other staff members called an ambulance. Upon arrival, the paramedics removed all of John's clothing and hosed him down. They took a bag of the chemical with them, and headed for the hospital. John remembers the paramedics talking to him, asking him questions, but he was unable to speak or respond. They gave John injections in the ambulance, but there was not enough time to get to the hospital from the rural nursery location. Another ambulance had to meet them with a heart-lung machine to keep John's heart beating, because otherwise he probably wouldn't have lived.

John #1 arrived at the hospital and was placed immediately in intensive care, still on a heart-lung machine. The injection began to work, and John started to perk up. A staff member would check on him every few minutes to keep him awake and talking. They also frequently had him blow into a machine to measure lung capacity.

For the four days John #1 was in the hospital, the symptoms came and went. He remembers feeling severe tension, anxiety, and having a very short temper and paranoia. It took two weeks for John to feel good. Now, six months later, he's pretty well over it, but he still is acutely aware of his condition, and still suffers occasional headaches and short temper. John said, "Even talking to you about it now, I'm getting a headache."

The doctors say the symptoms could linger for thirty days or thirty years, depending on his particular chemistry. Today John says the poisoning has a big psychological effect on him. He thinks a lot, and questions the value of what he is doing. He feels angry that the whole thing happened, and has thought of quitting agriculture as a profession. John is no big environmentalist, but he favors education in pesticide use, and alternatives to agricultural chemicals.

John #2's story is somewhat different, but similar in some surprising ways.

About a month ago, John #2 was calibrating his spreader, preparing to apply a granular material to his commercial turf. He normally takes precautions and uses gloves and a mask, but he was only calibrating the machine and the gloves and mask were in the shed, a few hundred yards away. So he picked up the opened bag, and dumped the contents into the hopper. It was slightly windy, and the powder fluffed up as he poured. A small cloud of pesticide powder formed over the hopper, briefly covering his face, chest, and arms. John #2 coughed once or twice, (continued on page 30)

(continued from page 29)

fanned away the cloud, and proceeded to calibrate the spreader.

Afterward, he went home, took a shower, had dinner, all the usual after-work activities, and felt fine. About midnight, however, he woke up with a severe headache and severe perspiration. This turned into "the shakes," and he felt the room start to spin around. Then John #2 felt alternately hot and sweaty, and then very cold. During the cold period, no amount of blankets could keep him warm.

A while later, John #2 settled down a little, and got up to look up pesticide poisoning in a farm chemicals book. Seeing the symptoms in the book were similar to his, he asked his wife to take him out to the farm, as he couldn't drive in his condition. He wanted to see what type of chemical this was, because he had never used it before. But before they got too far, the dizziness, sweating, and shakes returned, and John #2 told his wife to take him to the hospital.

Upon arrival, John had trouble convincing the staff of his problem. "How do you know you're poisoned?" they asked. One doctor told him he was just getting a bad cold, but John persisted, and another doctor was summoned, one who had experience in pesticide poisoning. After detailed discussion, including a call to the pesticide manufacturer, the doctor finally agreed that it was pesticide poisoning. John #2 was given antidotal injections, and kept for observation overnight.

In the morning he was released, and given a prescription to combat the symptoms. John #2 felt fairly good during the day, but every night the dizziness and sweating returned, as did the muscle spasms. The pills helped some, but he has not had a good night's sleep in the month since the incident. The seizures would last all night early on, but now they only go on for about two hours.

About two weeks later, John #2 drove his truck to the area where he had applied the material, and as soon as he got to the area, the attacks started. Later that week, he drove the tractor with the spreader that had contained the chemical, and again felt the dizziness and perspiration begin. As John was recounting the story to me, he began to perspire and salivate, and his eyes had a funny look to them, with constricted pupils. He says that even thinking about it can bring on the seizures.

John #2 told me that if he had to use the chemical to grow grass, then he would sell the farm. He got rid of the spreader and his clothes, and purchased a \$400 protective suit with mask, gloves, boots, the works. John will still not venture into the field where the material was applied, and he will not set foot on any golf course.

The type of pesticide poisoning which John #1 and John #2 suffered was organophosphate poisoning. This class of chemical (and also many others) can affect the transmission of nerve impulses, resulting in a broad range of symptom types, including, as John #1 and John #2 put it, "losing control of your body." If the nerve impulses are interrupted enough, the brain can't tell the heart to beat or the lungs to breathe, and death results.

As a consultant, I recommend agricultural chemicals every day. Like most of you, I try to respect the benefit from the use of chemcials, and to respect the environment as well. Why did I write this article? Not to scare, nor no alarm, nor preach. These guys who had this problem had worked in agriculture and had used chemcials for years. They are guys working and making a living in agriculture just like you. Pesticide poisoning can happen to anybody. It happened to these guys, and it can happen to you, easier than you think. Be careful, respect these materials, use your head, and encourage those who work for you to do the same.

New St. Augustine Variety To Be Released

By HAROLD JONES

A new variety of St. Augustinegrass developed by plant breeders at the Institute of Food and Agricultural Sciences, University of Florida.

'Floralawn" St. Augustine is resistant to St. Augustine decline virus, southern chinch bugs, and downy mildew. It is tolerant to sod webworms under low fertility.

Like "Floratam" it is equally coarse in leaf texture and stolon texture and is sensitive to winter injury, although no winter injury has been observed to date in Florida. It is very similar to 'Floratam' in its shade of tolerance and will not take as much as shade as "Floratine".

A major advantage of this grass is that it can be distinguished from other varieties of St. Augustinegrass by alcohol dehydrogenase, electrophoretic banding patterns and mophological characteristics.

There are so many questions as to whether or not a consumer has gotten the "Floratam' they paid for and this grass may help us reduce this problem.

This new variety has not been released to the sod growers and will probably not really be available for planting for at least 18 to 24 months.

Extension information and services are available to all individuals regardless of race, color, sex, or national origin.

Extension information given herein is for educational purposes only. Reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by the Cooperative Extension Service is implied.

We hope the information in this newsletter will help you have the grass which is greener on The Other Side. Suggestions regarding the content or format of this newsletter are welcome.

Getting Back To Basics -Turfgrass Fertilization

By G. S. SMITH IFAS, Ornamental Horticulture, Gainesville

Few horticultural professions involve the variety and complexity of problems one finds on a golf course. Turfgrasses are probably the most intensively managed crop in agriculture and with rigid and complex maintenance programs comes problems. If grass management was all tht one encountered on a golf course, the problems would be relatively simple. But there is much more than grass to be concerned with. There are soils, fertilizers, machines, trees, shrubs, flowers, weeds, pests, chemicals irrigation systems, etc., etc. And probably worst of all there are peoples problems. Thus the professional superintendent must be an agronomist, horticulturist, engineer nematologist, psychologist, and ad infinitum.

For those individuals who look at these compleities as challenges to their knowledge and skill, the job can be exceedingly rewarding. The types of skills and expertise one needs to be a professional superintendent are many and varied. But, one does not have to have a Ph. D. in all these subjects. On the contrar, probably the best turf managers are those individuals who have a broad and general understanding of the basic concepts of plants and soils. It is the "putting together" of all the pieces of basic information, in the right order, which separates a greens keeper from a professional golf course superintendent.

One of the pieces of knowledge which is vital for continued success is a basic understanding of "Turfgrass Fertilization." Proper fertilization involves much more than a superficial knowledge of fertilizers. Proper fertilization must include an understanding of plant nutrition, soil science, and fertilizers. A basic understanding of these three subjects is essential in managing turfgrasses as well as all ornamental plants.

PLANT NUTRITION

Perhaps the most basic concept one learns in plant science and one of the most important concepts a turf manager must understand is the "Theory of the Limiting Factor."

Six external factors are generally recognized as necessary for normal plant growth. They are:

- 1. Light intensity, quality and duration.
- 2. Heat proper temperature for growth.
- 3. Air for leaves and roots.
- 4. Water quantity and quality.
- 5. Nutrients around 16 essential.
- 6. Medium something to grow in.



(continued from page 31)

It is very important to remember that plant growth is dependent upon a favorable level and combination of these factors and that any one of them, if lacking or out-of-balance, can reduce or even stop plant growth. Furthermore, the factor which is *least optimum* will determine the level of growth. This theory of limiting factors can be simply stated as follows:

"The level of turf production (quantity and quality) can be no greater than that allowed by the most limiting of the essential growth factors."

Perhaps several examples will further stress this important concept in turf management.

First, consider the situation of a very shady tree. Obviously the grass is growing poorly. But why? The limiting factor concept gives the answer (see Figure 1). In figure 1, let the level of turf quality by represented by the level of water in the barrel. The water level (turf quality) can rise no higher than allowed by the limiting factor which is light. All other factors are adequate but quality is limited by this one essential factor. If the tree is thinned and the grass receives more light, the level of turf quality can rise accordingly. Now in this example, the level of quality is limited by nutrition.

Before considering a further example, let us be more specific about turfgrass nutrition.



(continued on page 33)



(continued from page 32)

ESSENTIAL NUTRIENTS

All plants require certain chemical elements. These nutrients are called the essential elements. For an element to be regarded as essential it must fulfill the following requirements:

- 1. Without the element, a plant cannot complete its life cycle.
- 2. The action of the element must be specific; no other element can wholly substitute for it.
- The element must be shown to be directly involved in the nutrition of the plant.
- The element should be shown to be required for higher plants in general.

Around 1900 there were only 10 elements listed as being essential for plants. Today we recognize six additional essential elements so the list reads as follows:

Carbon	Nitrogen	Iron
Hydrogen	Phosphorous	Manganese
Oxygen	Potassium	Zinc
- 55	Calcium	Copper
	Magnesium	Molybdenum
	Sulfur	Boron
		Chlorine

The first step in proper fertilization is to realize that *all* turfgrasses require *all* 16 essential elements. The nutrients must be present in adequate amounts and proportions. The next two points to consider are: (a) Where do these elements come from; and (b) What do you do if one or more are lacking?

Figure 2 lists the sources of the essential elements. Higher plants obtain most of their carbon and oxygen from the air. The hydrogen is derived from water. All of the other essential elements are obtained from the soil via plant roots, in most situations. We have very little influence over the supply of carbon, hydrogen and oxygen and fortunately these three elements are seldom limiting. Ordinarily, from 94-99% of the plant is made up of these three elements and only 1-6% of a plant is composed of the other elements. In spite of this fact, it is the nutrient elements obtained from the soil which usually limit turf production. Fortunately, we can have a direct effect on the essential elements supplied by the soil the esentil elements supplied by the soil solution. All of these elements can be added to the soil and thus to the plant through the application of various fertilizers.

Now let us return to the limiting factor concept as it relates to turf nutrition and fertilization. Assume in this second example that all factors for growth are adequate except for nutrition (Figure 3). A good example would be a sod suffering from lack of nitrogen. Here is the situation as portrayed by the barrel where nitrogen is the limiting factor (Figure 3). Turf quality can be no higher than that allowed by the level of nitrogen. If one is lucky enough to know that nitrogen is deficient, the problem is easily corrected by adding a nitrogen fertilizer. But now what happens? Turf quality rises until it is limited again by the most limiting factor. In this case, iron. So to increase quality any further, iron must by applied.

Of course this example could be carried on and on. But where does it lead us? It leads to this conclusion.

"All factors needed by plants - light, heat, air, water, and nutrients - *must* by available in adequate suplies and proper proportions before optimum quality cn be achieved." One or more factors or combinations will

always limit turf growth. The job of turf grower is to maintain adequate levels of all growth factors so that turf production is always at an acceptable level.

ESSENTIAL ELEMENTS

N	MACRONUTRIEN	ITS	MICRON	UTRIENTS
AIR WATER	SC	IL	so	DIL
Carbon Hydrogen	Nitrogen Phosphorous	Calcium Magnesium	Iron Manganese	Copper Molybdenum
Oxygen	Potassium	Sulfur	Zinc	Boron Chlorine

Figure 2. Essential Elements Required by Turfgrasses and Their Sources.

SOIL SCIENCE

Basic soil science is a second subject one must be familiar with when planning fertilization program. So far it has (continued on page 35)



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Purple Nutsedge

(Cyperus rotundus L.) (Coco-Grass)

By STEVE BATTEN

Purple nutsedge is not the most common sedge in golf course course turf in Florida, but it is the most difficult to control. A native of Eurasia, purple nutsedge headed the list of the 10 worst weeds in the world according to Leroy Holm in Weed Science in 1969.

The thin 2-6 mm wide flat leaves have a defined rib vein which can be felt by hand on the back of the leaf. Seed stalks are triangular in circumference with seed spiklets varing from 3-9 per plant. The reddish purple to reddish brown seeds give way to the name purple nutsedge.

The nuts or turbers are formed on thin rhizomes. These rhizomes and tubers are the main reason purple nutsedge is difficult to control, but these are also the key to successful control.

Repeated applications of organic arsentical herbicides such as MSMA have been shown to be effective only if continual application is made at bi-weekly intervals. As new shoots reoccur from the tubers, another MSMA application will reduce them. Finally after enough applications are made with MSMA, the total population of purple nutsedge is reduced, but not necessarily killed. Persistence is the answer to control.

Research by southern universities have shown that the early stage of plant development or early in the summer is the best time for successful nutsedge suppression.

Fumigation with methyl bromide is a very effective way to control the tubers of purple nutsedge. This is one more reason why fumigation is important during putting green construction.

Illustration by Steve Batten

(continued from page 33)

been agreed that optimum quality can be realized once all essential growth factors are supplied in adequate amounts and in proper proportions. This sounds very simple but can actually be rather complex. We know which elements plants require but the problems then become:

(1) How much of each essential element is adequate or optimum?

(2) How can these elements be supplied? In what form and how often?

SOIL TESTING

Over the last twenty years, research in Florida has fairly well defined the minimum and optimum levels of several of the essential element in both turfgrasses and soil Table 1 summarizes the desirable soil pH range and minimum nutrient levels of several elements in soils. If these levels are maintained in the soil, deficiencies of these four elements should not occur.

These soil nutrient levels are one of the measurements you should use when determining a good fertilization program. Soil testing is not, however, the cure-all for all your problems. Rather it is only one tool at your disposal.

A few cautions need to be stated at this point. There are many laboratories which analyze soils and most are reliable. Choose one lab and let them do the testing and give recommendations. Do not try to compare labs and their recommendations. Testing procedures vary from lab to lab and from state to state and their fertilization recommendations are based on their own testing procedures. Soil tests are only useful if they have been correlated with turf responses. So, again, use one reputable lab and follow their programs unless they seem way out of line.

The University of Florida Soil Testing Lab will routinely give you the following information: soil texture, organic matter, pH, and the pounds per acre of calcium, magnesium, phosphorous and potassium. Nitrogen is also reported but values are of little use. The example shown here would be a very good nutritional level for growing bermudagrass. Use your soil analysis results to help you decide on a fertilizer program.

TABLE 1. SUGGESTED SOIL pH RANGES AND MINIMUM NUTRIENT LEVELS FOR FLORIDA LAWN GRASSES*

			Pounds	Per Acre	
Grass	рН	CaO (Calcium)	MgO (Magnesium)	P2O5 (Phosphorus)	K ₂ O (Potassium)
Bermuda St. Augustine Zoysia	6.0-6.5	1200	150	50	150
Bahia Carpet Centipede	5.5-6.0	600	100	40	100

* Based on acid ammonium acetate extraction.

An obvious shortcoming of soil testing is this - it only tells you the levels of C., Mg, P, K and soil Ph. It does not provide information of levels of S, Fe, Mn, Zn, Cu, Mo, B (continued on page 36)



* Proven nutritional programs.

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(continued from page 35)

and gives little useful data on N in the soil. Luckily, these elements, with the exception of nitrogen, are required in relatively small amounts and need be supplied fairly infrequently. Also, they are often applied as constituents of other fertilizers such an natural organics.

FERTILIZERS

A detailed discussion of all the fertilizers used on turf is beyond the scope of this paper. For information on basic turf fertilizers I would refer you to the paper by Mr. Ralph F. Jones entitled "Fertilizers—Basic Chemicals," published in the 1969 FT-GA Proceedings. For a very comprehensive publication on fertilizers, obtain a copy of "Fertilizers and Fertilization," by Dr. G.M. Volk, Soils Chemist, University of Florida. This Extension Bulletin may still be available from your County Extension Service. Specific turfgrass fertilization recommendations can be found in the Extension Circular 357, "Turfgrass Fertilization" by H.G. Meyers and G.C. Horn.

The remainder of this discussion will cover general types of fertiliers used on turfgrasses, understanding the fertilizer tag and sources and characteristics of primary plant foods.

THE FERTILIZER TAG

First of all let us take a close look at a fertilizer tag. An understanding of the fertilizer label can prevent many problems such as waste of maney, waste of materials, damage to turf and needless ependitures for materials containing unnecessary components or the wrong kind of ingredients.

Fertilizers are identified by analysis and/or by brand name. The more common commercial fertiliers are usually known by the analysis numbers such as 6-6-6 or 16-4-8. Many specialty fertilizers are referred to by brands such as Blue Chip, Milorganite, Turf Special, etc. Regardless of how the material is named, the important information must be printed on the label.

The analysis numbers, such as 6-6-6 or 16-4-8 give the percent nitrogen, available phosphoric acid, and watersoluble potash, respectively. The numbers represent percentages or units in fertilizer terminology. Thus a 100-pound bag of 16-4-8 contains 16 pounds of nitrogen, 4 pounds of available phosphoric acid and 8 pounds of water-soluble potash. These three elements are called the available primary plant foods and are often used as the name of the fertilizer, for example, 16-4-8.

In addition to the primary elements, the fertilizer may contain secondary plant foods. These are also reported on the label, at the bottom, if they are guaranteed present. The secondaries include calcium, magnesium, sulfur, manganese, zinc, copper, boron, iron and molybdenum. The last six (Cu, Mn, Zn, B, Fe, Mo) are called micronutrients.

The label also gives you the materials from which the fertilizer has been made. This information is listed beside the *derived from* from statement. Chlorine content is also listed since it may be injurious to some plants.

SOURCES AND CHARACTERISTICS OF PRIMARY PLANT FOODS

With a closer look at the fertilizer label you will see that the percent nitrogen is subdivided into four different forms. Since nitrogen is the backbone of your fertilization program and the major expense, it is critical to understand the different types of nitrogen and the advantages and disadvantages of each. In most instances, a satisfactory fertilization program can be achieved using any one or combination of many nitrogen materials. However, it is absolutely essential to understand the characteristics of each material and to use them accordingly.

The four forms of nitrogen listed on the label are: nitrate N, ammoniacal N, water-soluble organic N (a very misleading form of N) and water-insoluble N.

Rather than discussing these forms individually, let's look at the types of N fertilizers as they are related to turf availability and response. For ease of discussion, nitrogen fertilizers may be divided into three groups: (1) immediately soluble and available sources, (2) synthetic organic sources, and (3) natural organic sources.

In the immediately available group is ammonium nitrate, ammonium sulfate, calcium nitrate, nitrate of soda, and urea, a material often listed as a synthetic organic source. This form of nitrogen, urea, should be considered as equivalent to ammoniacal N since it is readily available. It should never be thought of as a slowly available organic nitrogen source. These fetilizers are often called soluble, readily available, inorganic or chemical N fertilizers. They contain nitrate and/or ammoniacal nitrogen and they have the following advantages and disadvantages:

Inorganic Nitrogen Sources

Advantages	Disadvantages
Readily available N	Leach readily
Low cost per unit of N	High salinity potential
Can easily control N levels	Danger of fertilizer burn
Little problem of residual N May have greater efficiency	Must be applied at low rates, frequently
	High Labor costs since frequently applied
	Acid forming

In the natural organic category are materials such as activated and digested sewage sludges, guano, cottonseed meal, castor pomace, and certain animal byproducts. Practically all of the nitrogen in these products is water-insoluable N. Water-insoluble Nitrogen cannot be used directly by the plant but must be converted to ammoniacl and nitrate nitrogen by soil micro-organisms.

Natural Organic Nitrogen Sources

Advantages	Disadvantages
Slow release of N, thus no rapid growth flushes; less subject to leaching	May be very expensive Don't release N in cool weather Usually low in N so large volume
Seldom burn turf	must be handled
Can apply more at one time so reduced labor costs	Less control over N levels

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The last group to consider are the synthetic organic nitrogen materials. If urea is not considered in this group for reasons already covered, it includes only two types, urea formaldelyde and isobutylidine diurea. The former is commonly called UF or ureaform, while the latter is known as IBDU.

Ureaform is a material containing about 38% nitrogen made by chemically combining urea and formaldelyde. This material must be converted to ammoniacal and nitrate nitrogen by soil organisms before it can be used by plants. However, it does contain some simple urea whose nitrogen is imediately available. For the most UF materils, approximately one-third of the nitrogen is rapidly available, one-third moderately available, and one-third so slowly available that it must be built up to considerable quantity in the soil to release nitrogen in significant amounts.

Since UF fertilizers are high analysis, light weight, slow release materials they combine easy handling, safety in application and low application costs. Their disadvantages include high cost per unit of nitrogen, poor effectiveness in cold, wet periods, and high residual levels needed for prolonged nitrogen release.

IBDU is a relatively recent addition to the synthetic orgnic nitrogen category. It contains 31% nitrogen and releases nitrogen slowly as the particle dissolves in the soil water. IBDU releases nitrogen even in cool weather since it is not directly dependent on soil microorganisms for conversion to an available form. Several advantages of IBDU are its lack of superfluous, rapidly available nitrogen which produces excessive flushes of growth and its apparent safety even when applied at high rates. IBDU is not, however, the perfect material for turf fertilization. It has a high cost per unit of nitrogen and releases nitrogen constantly as long as soil mosture is available. This means that too much nitrogen could be released during rainy periods or under heavy irrigation, even when turf may be needing little nitrogen. Also, a satisfactory fertilization program with IBDU will be dependent upon a well designed and operating irrigation system.

Now just a few comments on phosphorous and potassium fertilizers. These materials are applied much less frequently than nitrogen. They may be applied in combinations with nitrogen in complete fertilizers or individually in various materials.

Available phosphorous comes mainly from superphosphate, ammonaited superphosphate and triple superphosphate. Maintain the soil P level at 50 pounds per acre as determined by our soil test. Most golf greens contain enough P from complete fertilizations in the past to last many years.

Potassium levels can be adjusted as indicated by soil tests by addition of materials like muriate of potash, sulfate of potash magnesia, nitrate of potash, sulfate of potash and nitrate of soda potash. A general rule of thumb to remember is to apply 2 1/2 to 5 pounds of K per 1,000 sq. ft. per year or about 1 pound of potassium for every 3-4 pounds of nitrogen applied.

(continued on page 38)

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(continued from page 37)

SUMMARY

If I can possibly summarize this discussion on turf fertilization, it might be something like this:

A healthy, well-maintained golf course can be a beautiful landscape which has great functional and aesthetic value. However, such an environment doesn't just happen! It is the result of a lot of hard work and is realized only if its plants are grown under near ideal conditions. This includes adequate light, air, water, proper temperatures, a suitable soil to grow in and a supply of essential nutrients.

A good fertilization program is a vital part of your management system and one tool you have control over. Proper fertilization involves a basic understanding of plant nutrition, soil science and fertilizers.

There is probably no single magical fertilizer or fertilization program even though there are frequent claims to that effect. First, realize that all plants require the same essential elements in proper amounts and proportions. Several nutrients like nitrogen, phosphorous and potassium are required in much greater quantities than others but all 16 are essential. Secondly, use soil testing only as a guide to help you decide when and how much phosphorous, potassium, calcium and magnesium are needed and if soil pH needs to be adjusted. And finally, design a nitrogen fertilization program to produce acceptable quality turf for your particular golf course. In most instances, a satisfactory nitrogen fertilization program can be achieved using one or several materials. The critical thing is to understand the charcteristics of each material and to use them accordingly. One material may be easier to apply, safer, less expensive to buy or apply, or more effective than another in any given situation. But, there is no perfect recipe for all turf. You must formulate your "best" program for your conditions. You can achieve this goal if you understand the basic principles we have covered in this discussion.

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New From Lebanon

Now available for fall fertilization — Country Club 8-4-24, a new homogenous formulation with 30% WIN and 100% Sulphate of Potash. It is specifically designed for three specific turf applications:

- (1) Fall and Late Fall Feeding.
- (2) Where Potash Levels are Low.

(3) Where Low Nitrogen and Higher Potash is Desired.

With one simple application during the growing season, Country Club 8-4-24 will help insure winter and summer hardiness, increase disease resistance, and promote more erect growth.



New sandtrap rakes with fiberglass handles are available now from LESCO, Inc., Rocky River, OH.

The more durable fiberglass handle will not warp. The yellow color has been molded in and not painted on. In addition to the change in the handle, improvements have been made to the rake mold to make available a rake head with or without a spike. Heads to fit the standard wooden handle LESCO trap rake will be available, too, with or without a spike. The rake heads will continue to be available in yellow or black.

The new fiberglass handle LESCO TRAP RAKE joins the complete line of golf course accessories and turfgrass equipment replacement parts available from LESCO, Inc.



Fertilizers — Basic Chemicals

By RALPH F. JONES

Fertilizers supplement the fertility of the soil and supply the essential elements plants use to manufacture their own food.

Plants require 17 essential elements for normal growth. Three of these elements, carbon, hydrogen and oxygen, come from air and water. These elements are needed in large quantities and are necessary for the production carbohydrates, fats and protein. The elements that are supplied by the soil and/or the application of fertilizers include the primary, secondary, and trace elements. The primary elements are nitrogen, phosphorus, and potassium. The secondary elements include calcium, magnesium, and sulfur plus sodium, which has been added to the list recently. The trace elements include manganese, iron, copper, zinc, boron, molybdenum and chlorine. Chlorine is not considered an essential ingredient of fertilizers as there normally is an abundance of this element. We generally are more concerned with an over supply of chlorine than a shortage.

The essential elements each have certain functions in the plant. There are also a number of materials available that

contain these elements in a plant-usable form. In order to acquaint you with some of the main functions of these elements and the available materials, each element will be listed with this information given. The plant food content of each material will be given in either the elemental or oxide form and in some cases both. In Florida, most elements are guaranteed as oxides. Please note that some materials are listed under more than one heading as they supply more than one essential element.

Nitrogen — Promotes growth and color, necessary for protein formation

Sewage sludges	5% to 6% N
Castor Pomace	4% to 6% N
Cotton Seed Meal	4% to 7% N

Synthetic organic nitrogen materials

Urea (all water soluble)		46% N
Ureaform (mostly water	soluble)	38% N

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Chemical Nitrogen Materials

Ammonium Nitrate 3	3.5% N
Ammonium Nitrate Limestone	20% N
Ammonium Sulphate	21% N
Nitrate of Soda	16% N
Potassium Nitrate	13% N
Monoammonium Phosphate	11% N
Diammonium Phosphate 16% to	21% N

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Superphosphate	18% to 20% P2O5
Triple Superphosphate	42% to 56% P2O5
Monoaamonium Phosphate	48% to 60% P2O5
Diammonium Phosphate	46% to 53% P2O5

Potassium — Necessary for cell division, builds structure, hardens plants, increases disease resistance.

Sources

Muriate of Potash	. 60% to	62% K2O
Sulphate of Potash	. 48% to	50% K2O
Potassium Nitrate		44% K2O
Nitrate of Soda-Potash		14% K ² O

Calcium — Stimulates root and normal leaf development, corrects soil acidity

Sources	
Dolomitic Limestone	22% Ca 30% CaO
Hydrated Lime	54% Ca 75% CaO

Superphosphate	20% Ca 28% CaO
Calcium Sulphate (gypsium)	22% Ca 30% CaO
Magnesium - Necessary for chro	rophill formation
Sources	
Dolomitic Limestone	11% Mg 18% MgO
Magnesium Sulphate	18% Mg 29% MgO
Sulphate of Potash	
Magnesia	11% Mg 18% MgO
Sulphur — Necessary for protei chlorophill development	n formation and
Sources	
Superphosphate 12% to 14%	S 30% to 35% So ³
Calcium Sulphate 15% to 18%	S 37% to 45% So ³
Sulphate of Ammonia 23%	S 57% So ³
Sulphate of Potash 179	% S 42% So ³
Magnesium Sulphate 24	% S 60% So ³

Sodium — May be utilized by the plant in place of potassium but cannot be used to replace all potassium in the plant. Normally not considered a necessary element in a fertilizer program. Nitrate of soda is a material that contains sodium.

Sources

Manganese Sulphate 23% to 25% Mn 29% to 32% MnO

Iron — Essential for chlorophyll formation Source (continued on page 44)

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- Amelia Island Plantation Golf Course, FL
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- St. Andrews of the Gulf, MS
- Eden Isle Country Club, LA

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For your golf course, good crabgrass control just isn't good enough.

Because what may look like crabgrass might actually be goosegrass.

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NOTHING BEATS RONSTAR HERBICIDE ON GRASSY WEEDS.

Other herbicides may take care of your crabgrass for you. But when there's goosegrass on your course too, you need the added protection only RONSTAR can provide.

RONSTAR effectively controls crabgrass, and it's the unchallenged leader in goosegrass control, as the 9-year test summaries in the chart show clearly.

And RONSTAR gives excellent control season-long, regardless of weather, because it won't leach from the soil.

And since RONSTAR is highly selective, it won't weaken

your turf through root pruning.



Summary of 9 years of testing conducted by University Experiment Station and Rhône-Poulenc personnel.

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mudagrass, tall fescue, zoysia and St. Augustine grass, but also on a broad range of ornamental plantings, ground covers and trees.

That means you can even use it all around the course and the clubhouse for excellent weed control.

If you suspect that crabgrass isn't the only grassy weed problem on your course, play it safe. Use RONSTAR this season,

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and economically. You need quality turf products you can depend on. You need COUNTRY CLUB and GREENSKEEPER PROFESSIONAL TURF PRODUCTS from LEBANON.

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Chlorine — Present in plant tissue but not considered a necessary element in a fertilizer program. Concern is given to an excess, rather than a deficiency.

Now that we have covered the essential elements and the fertilizer materials that supply these elements, I would like to supply some information on manufactured fertilizers. As you know, manufactured fertilizers are the most common source of plant nutrients. They are identified by analysis numbers and/or by brand name. The common practice is to refer to the commercial fertilizers by the analysis numbers whereas many specialty fertilizers are referred to by brand name. In either case, the fertilizer will have a guaranteed analysis which is printed on a tag or may be printed on the bag.

The analysis numbers, such as 16-4-8 give the percent nitrogen, available phosphoric acid and water soluble potash in a fertilizer mixture. The first number (16) always refers to nitrogen, the second number (4) available phosphoric acid, and the third and last number (8) water soluble potash. If a mixed fertilizer did not contain all three of the primary plant foods, then a zero would be indicated in the analysis for the missing element. For example, an 8-0-8 fertilizer would be one that did not contain available phosphoric acid. A 0-14-14 would not contain nitrogen.

The guaranteed analysis, as required by the Florida Fertilizer Law, gives the percent of the primary, secondary and trace elements, if present, in a mixed fertilizer. It also gives a breakdown of the nitrogen into nitrate, ammonical, water soluble organic nitrogen and water insoluble organic nitrogen. It also lists the materials that were used to manufacture the fertilizer. In florida, a mixed fertilizer must contain a minimum of 16 units or 16% plant food (the minimum may vary depending on (continued on page 45)

(continued from page 44)

state laws), if it is to be offered for general sale. Most fertilizers today contain more than the 16% minimum. The question is often asked, why the low percentages of plant nutrients in a mixed fertilizer. Why is it not possible to buy fertilizer containing 100% plant food? Plants use fertilizer nutrients in a combined form. In checking, vou will note that the materials containing plant nutrients in a combined form as listed under the various elements are relatively low in plant food. It is not possible to take materials that are relatively low in plant food. combine them in a mixture, and come up with a fertilizer containing 100% plant food or high percentages of plant foods. When formulating a mixed fertilizer, the manufacturer will use the best materials available at the most favorable cost per unit of plant food.

Most quality fertilizers for turf contain some organic nitrogen. Fertilizers that contain organics usually are referred to as a 25% organic or 50% organic etc. This percentage refers to the percent organic nitrogen in the fertilizer. This does not refer to the amount of organic material (pounds of organic) in the mixture, but rather refers to the portion of the nitrogen content that derived from organic materials. To determine the percentage of organic nitrogen in a fixed fertilizer, add the amount of water soluble organic and water insoluble organic guaranteed in the mixture and divide by the total nitrogen, then multiply by 100. Listed below is the nitrogen breakdown from the guaranteed analysis (Florida) for an 8-4-6 fertilizer that contains 25% natural organic nitrogen. This is an example showing how the organic nitrogen content can be figured.

Example: 8-4-6 analysis TOTAL NITROGEN 8.00% Nitrate Nitrogen 2.00% Ammoniacal Nitrogen 4.00% Water Soluble Organic Nitrogen 0.20% Water Insoluble Nitrogen 1.80%

.25 × 100 = 25% Organic Nitrogen 8 2.00 16 40 40

The formula for a mixed fertilizer is guite often confused with the analysis. The formula actually is used in the manufacturing process to arrive at the particular analysis and type mixture desired. "Filler" is another term used in connection with mixed fertilizers. It is a low plant food or non plant food material that is used to standardize weight in some low analysis all checmial mixtures. High analysis fertilizers and mixtures that contain high amounts of natural organic nitrogen contain very little or no filler.

The cost of a fertilizer is determined by the analysis and the materials used to formulate a particular mixture. A fertilizer that contains good slow acting organics and secondary and trace elements would cost considerably more than a fertilizer with an identical analysis but that

(continued on page 46)

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(continued from page 45)

did not contain these ingredients. Fertilizers can have identical analysis numbers but vary in price and quality and the results produced. Price comparisons should be made based on pounds of product of comparable quality and analysis or the pounds of fertilizer (comparable quality) needed to supply the amount of actual plant food desired for a given area, regardless of whether the fertilizer is in a pulverized, pelletized, lightweight, soluble, or liquid form. Other factors such as labor saving, ease of application, and results should also enter into the final decision as to which would be the best to purchase.

The forms of fertilizer that are available include pulverized, which is a mixture of dry fertilizer materials and can be made in small quantities, (a few tons at a time), or pelletize or granular fertilizers that are manufactured by mixing solutions and dry materials together and that are made in large quantities (several hundred tons at a time) in a continous process. Bulk blend mixtures are made up of a mixture of granular materials physically mixed together. Solubles are made with fertilizer ingredients that readily dissolve in water and that can be applied with a sprayer or through an irrigation system. A liquid fertilizer is one that contains the soluble ingredients in a liquid form for spray application or by injection through an irrigation system.

Application rates for fertilizers and particularly fertilizers for turf, are usually determined by the nitrogen content. Normally from one to two pounds of N (nitrogen) per 1,000 sq. ft. would be applied for feeding of a regular dry fertilizer. Soluble or liquid fertilizers are usually applied at lower rates per feeding, with more applications for season or year than dry fertilizers. A hundred pound bag of 6-6-6 contains 6 lbs. of N, whereas a hundred pounds of 16-4-8 contains 16 pounds of N. To determine the amount of fertilizer to apply, divide the percent nitrogen

into 100, which will give the pounds of product necessary to apply one pound of N. Multiply this figure by the number of pounds or fractions of pounds of N desired, to obtain the rate to use. An example, using a 16-4-8 fertilizer, is listed below.



For your information, several common fertilizer materials and some popular mixed fertilizers are listed below by analysis with the number of pounds of product necessary per 1,000 sq. ft. to apply from a low rate of $\frac{1}{2}$ lb. of N, up to a high rate of $2\frac{1}{2}$ lbs. of N per 1,000 sq. ft. Chemical materials and soluble or liquid fertilizers should be applied at the lower rates with more frequent applications.

RATES FOR FERTILIZERS LISTED ARE AS FOLLOWS

Amount of Product to Apply Per 1,000 Sq. Ft. To Obtain Amount of Nitrogen Listed

(continued on page 47)



(continued from page 46)

Fertilizer	Analysis				
	.5# N	1# N	1.5# N	2# N	2.5# N
5-4-0	10 Lbs.	20 Lbs.	30 Lbs.	40 Lbs.	50 Lbs.
6-3-0	8.3	16.6	25	33.2	41.5
6-6-6	8.3	16.6	25	32.2	41.5
8-8-8	6.25	12.5	18.75	25	31.25
10-10-10	5	10	15	20	25
12-4-8	4.16	8.33	12.5	16.66	20.82
16-4-8	3.12	6.25	9.4	12.5	15.62
20-5-5	2.5	5	7.5	10	12.5
20-0-0	2.5	5	7.5		
33.5-0-0	1.5	3	4.5		
45-0-0	1.1	2.2	3.3		

In addition to straight fertilizers, there are also a number of fertilizer-pesticide combination products that are available for use on turf grasses. These products are regulated by the Florida Fertilizer Law and only those combinations that have been approved can be offered. The Law limits the amount of pesticide that can be included in a mixture and requires that a caution statement appear on the label for the product. The directions for use must also be in line with federal and state recommendations. If the mixture will be sold across state lines, then it must also be registered in each state where it will be sold as well as in Washington (federal), and must comply with all state and federal regulations as far as labeling and use is concerned.

Presented at the 17th Annual FT-GA Conference by Ralph F. Jones, Specialty Products Manager, Wilson & Toomer Fertilizer Co., Jacksonville, Florida. ■

Lofts Presents Rutgers \$65M In Royalties

Bound Brook, NJ — Lofts, Inc. recently awarded Rutgers University royalties totalling more than \$65,000. Jon Loft, Lofts President and Chairman of the Board, presented the check at the 1984 Rutgers Turfgrass Field Day. The check was accepted on behalf of Rutgers University by Dr. Lowell A. Douglas, Chairman of Rutgers' Department of Soils and Crops.

Mr. Loft credited the unusually high royalties to the increased demand for high-quality turfgrasses. The



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Royalties play a vital role in the research and development of new turf varieties. Through the marketing efforts of companies like Lofts, these improved varieties are made available for commercial and public use.

For additional information, please contact Lofts Inc., Bound Brook, NJ 08805. (201) 356-8700. ■







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CHIPCO MOCAP knocks out a broad range of surface insects, including chinchbug and sod webworm. And if nematodes or mole crickets are destroying your turf, you can destroy them, too, with CHIPCO MOCAP.

For the fastest, most effective control of grubs and other turf pests, include CHIPCO MOCAP in your turfgrass management program. CHIPCO MOCAP from Rhône-Poulenc Inc., makers of CHIPCO[®] 26019 and CHIPCO[®] Ronstar,[®] is a new addition to the CHIPCO line of fine products for turfgrass protection.

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Jon Loft, Chairman Lofts, Inc. presents check for \$65,232.26 to Rutgers University. L to R in rear are Dr. R. Hurley of Lofts, Drs. H. Indyk, R. Duell, C.R. Funk, L.A. Douglas and R. Engel all of Rutgers University.





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By Frank Abrahamson Publisher Florida Grower & Rancher

New book documents the fallacy of the political myth of agricultural chemicals as cancer causing agents

Rachel Carson was a dedicated scientist. There was room for little else in her life. During most of her career, she enjoyed an impeccable reputation among her peers.

Toward the end, she "cracked". Turning from fact to doomsday theory, she published Silent Spring in the early 1960s. As a result, she died lonely, discredited and forgotten by her colleagues.

But she spawned a "new school" of negativism that continues to gain momentum as it affects the lives of every resident of Planet Earth. Under the umbrella of "environmentalism", such words as contamination, carcinogen and pollution have become everyday expressions in our vocabulary.

New national and state governmental bodies like the Environmental Protection Agency and Occupational Safety and Health Administration drain our tax "contributions". Organizations like the National Institute of Environmental Health Sciences and the National Institute for Occupational Safety and Health provide jobs for persons rejected by the scientific community. Groups like the Audubon Society and Sierra Club have "conned" journalists and gained a platform for "issues" far beyond their ken and "far out" from the worthy purposes for which they were established.

The net result has been an ill-informed and disillusioned public.

Finally, after 20 years of chaos, an all-encompassing synopsis has emerged to help swing the pendulum back to the middle and bring these issues into rational focus.

With the publication this Summer of The Apocalyptics, Edith Efron points out the following:

 Most causes of cancer occur naturally. Man-made chemicals and other products contribute very little to this health threat.

• Projections linking cancer in laboratory animals to humans are not scientifically valid. The only way to properly evaluate this is to study man himself.

• By "laying the blame" on pesticides and other chemicals, science has been corrupted, and the public deceived by unqualified politicians who want to regulate business.



The breathtaking first hole at Cherry Hills Country Club, Englewood, Colorado. Home of the 1985 PGA Championship.

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To best suit your needs, LESCO offers its new fairway unit with a five, six or tenblade reel. The mowers can be grouped on a five, seven or nine-gang frame – all available from LESCO. And because LESCO manufactures and sells direct to the user, there are no distributors or middlemen to increase costs.

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park and recreational land; corporate and industrial sites; sod fields and other large turfgrass areas. Ease of operation, simple maintenance and economical mowing are just three of the many benefits you will realize with the LESCO Fairway Mower.

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For more information about this newest piece of equipment from LESCO, we invite you to contact your LESCO salesman or give us a call toll free. When you call, ask for Jeff Mack. He's our equipment product manager and can help answer any questions you might have.

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