



MEETING NOTICE

Date: October 13, 1976
 Place: Woodway Country Club
 Golf: 12 noon on
 Lunch: available in grill room
 Cocktails: 6 PM
 Dinner: 7 PM
 Program: Dr. Murdock, University of Hawaii
 Host: Sherwood Moore
 Directions: Take Merrit Parkway to exit, take Hoyt Street south, Woodway is on your right.
 Please return your cards promptly

COMING EVENTS:

October 4 NJGCSAA Turf Field Day, Hominy Hills Golf Club
 October 14 LIGCSA Invitational, Mill River C.C.
 October 21 LIGCSA Smithtown Landing Club
 October 27-28 Wisconsin Golf Symposium, Milwaukee, Wis.
 November 18 MGCSA annual meeting
 November 16-18 NY State Turfgrass Association Conference, Albany, NY
 December 6-9 NJ Turfgrass Expo
 December 18 MGCSA Christmas Party

M.G.C.S.A. News: Chuck Martineau did a great job, organizing and hosting the annual Lawrence Labriola Tournament. Let's hope that this Tournament grows and that more of our own Superintendents support it. We only had 18 Superintendents in attendance. Vinnie Pentenaro, Al Caravella took part in the G.C.S.A.A. golf tournament in Sylvania, Ohio during the 50th anniversary celebration. It certainly was worth the trip to see the many old pieces of equipment actually demonstrated. They had 4 different slide presentations going on all day. It featured the history of G.C.S.A.A., the equipment industry from way back when. Tom Mascaro showed the changes in the profession. Mel Lucas Jr., had some of his old horse pads, old bronze cups, a hand greens mower that was used for finish cut. Did you know that Arnold Palmer had a brother who is now at Penn State and is going to be Superintendent at Latrobe C.C. Arnold spent his whole dinner hour signing autographs.

John Traynor is the new superintendent at Westchester C.C. Welcome to Westchester and the M.G.C.S.A. John. John as you know has been a member of M.G.C.S.A. for several years.

M.G.C.S.A. Nominating Committee: Ray Twombly and Sherwood Moore are co-chairman of the Nominating Committee. If you are interested in serving or becoming active in M.G.C.S.A. please contact them.

WELFARE:

Keep us informed. Call Dick Gonyea 914-835-3205, Dan Cancelleri 914-667-3737 or Roger Morhardt 914-279-7181 with any information which you think should be shared.

We wish Albie Pentenaro a speedy recovery from a recent operation. We are glad to report Al Radko is back playing golf and working too.

METROPOLITAN GOLF COURSE SUPERINTENDENTS ASSOCIATION RESEARCH FUND REPORT

To date the following clubs individuals and commercial firms have supported the M.G.C.S.A. Research Fund. This money will be used to underwrite Research by the Entomology Department of Cornell University on the Hyperodes Weevil and the Dung Beetle.

Clubs:

- | | |
|--------------------------|---------------------------|
| The Apawamis Club | Bonnie Briar Country Club |
| The Ardsley Country Club | Brae Burn Country Club |
| Blind Brook Club | Burning Tree Country Club |



Host Superintendent Charles Martineau greeting all the friends of Lawrence Labriola and fellow superintendents of MGCSA.



Editorial Staff

Garry Crothers *Co-Editor*
 Ted Horton *Co-Editor*

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Elmwood Country Club	Scarsdale Golf Club
Fenway Country Club	Silver Springs Country Club
Fresh Meadow Country Club	Shore Haven Golf Club
Garden City Golf Club	Sleepy Hollow Country Club
Innis Arden Country Club	Sterling Farms Club
Knollwood Country Club	Sunningdale Country Club
Metropolis Country Club	Waccabuc Country Club
Old Oaks Country Club	Wee Burn Country Club
Quaker Ridge Country Club	Whippoorwill Club
Ridgeway Country Club	Winged Foot Golf Club
Rockrimmon Country Club	Woodway Country Club
Piping Rock Club	Wykagyl Country Club
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We would like more clubs to be involved in the research fund.

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The three musketeers; Harry, Chuck and Al.

SULFUR AND BENTGRASS PUTTING GREEN TURF

by Dr. Roy L. Goss
 Washington State University

Adequate soil fertility is of great importance to the growth and development of turfgrasses. The major plant food elements nitrogen, phosphorous and potassium have received most of the attention in turfgrass fertility research and practice; however, lack of any one of the essential plant nutrients, N, P, K, Ca, Fe, S, Mn, B, Mg, Cu, Zn, Mo, and CI will result in unsatisfactory growth. The information presented in this paper will deal mainly with sulfur, but will attempt to bring out the influence of N, P, and S on various factors related to putting green turfgrass quality.

The Sulfur Picture has Changed

A number of factors are responsible for increased sulfur needs of turfgrasse. Coleman (2) indicated that the use of high-analysis fertilizers that contain little or no sulfur, increased growth, and decreased gain of atmospheric sulfer by soils and plants as a result of decreased combustion of coal and other high sulfur fuels are some of these factors.

It is common knowledge that nutrients leach from sand at a faster rate than from heavier textured soils. Due to current emphasis on the use of sand for building putting greens and tees, we should be aware of the continual need to regularly supply all nutrients including sulfur in a reasonable ratio. In general, the higher the application of nitrogen, the greater the stress for sulfur and other nutrients due to increased growth. Nitrogen applications for greens vary from less than five to over 20 pounds per 1,000 square feet per year with eight to 12 pounds being very normal for many areas in the U.S. Volk and Horn (5) reported that yields and sulfur content of Tifway bermudagrass clippings from ammonium sulfate vs. am-

monium nitrate treatments superimposed on various potassium sources was significantly higher from the ammonium sulfate treated plots grown on a loamy fine sand soil. Woodhouse (6) has reported increased yields seven out of eight years on Coastal bermudagrass fertilized with 62 to 123 pounds of sulfur and 0 to 1,478 pounds of N per acre when grown on a Eustis sand. These citations support the writer's belief that sulfur has often been neglected on turfgrasses growing on sand.

Role of Sulfur and Deficiency Symptoms

Sulfur deficiencies seriously retard the growth of turfgrasses because the element is needed for:

1. Synthesis of the amino acids cystine, cysteine, and methionine, all required for protein synthesis.
2. Synthesis of some vitamins (biotin and thiamin, glutathione, and coenzyme A).
3. The formation of certain disulfide linkages which are associated with the structural characteristics of protoplasm. This is also associated with cold resistance.
4. The formation of ATP sulphurylase, an enzyme concerned with the metabolism of sulfur.

There are several other cited needs for sulfur including its effect on chlorophyll content which affects photosynthesis.

Sulfur Requirement for Turfgrasses

There is little information available regarding the requirements and tissue sulfur levels for turfgrasses. Martin *et al* (4) stated that many field fertilizer experiments with S have been carried out, but only in a few has plant content of S been determined over a few of S rates or for an entire season. Love (3) reported higher levels of S in seaside bentgrass tissue than in Merion bluegrass or Pennlawn red fescue. He showed levels of 0.19, 0.15, and 0.12 percent, respectively for the three grasses when receiving adequate fertilizer; and levels of 0.08, 0.06, and 0.04 percent, respectively when deficient. Beaton (1) has stated that about 0.20 percent S in turfgrass tissue would seemingly be about normal for good growth. Data presented by Love (3) also showed that tissue phosphorus levels were lower than tissue sulfur. It can be assumed from the little data

available that S and P levels should be approximately equal.

Sulfur Research at Washington State

The research reported in this paper was conducted at the Western Washington Research and Extension Center at Puyallup, Washington. Sulfur applications were started in 1967 on Astoria bentgrass putting green turf that was established in 1959 on a sandy loam soil. Fertilizer treatments from 1959 through 1967 were made up of all combinations of 20, 12 and 6 pounds of Ni, O and 4 pounds P205 phosphorus, and O, 4 and 8 pounds of K20 potassium per 1,000 square feet per year. In 1967, sulfur was applied to all plots that previously received potassium at rates of 0, 1.15, and 3.45 pounds of elemental wettable S per 1,000 square feet. Subsequently all potash was applied uniformly to all plots except the check at 8 pounds K20 per 1,000 square feet per year. All sulfur was applied in March and April of each year in three equal applications.

Effects of S on Color and Yield

All plots receiving 20 or 12 pounds N appeared significantly darker green when treated with 1.15 or 3.45 pounds S, regardless of P or K levels. The same treatments without S were pale, showing little response to N and had less turf density. Only slight color differences were observed at the 6 pound N level with and S treatment, but were slightly favored by 1.15 pounds S.

Although yield is not considered a highly desirable feature on putting greens, it still is a measure of vigor. Plots receiving 20 pounds N, 4 pounds P205 and 8 pounds K20 per 1,000 square feet at both S levels produced 71 percent more clippings than plots receiving N only. S applied at 1.15 pounds produced slightly more clippings than 3.45 pounds S. This indicates that 1.15 pounds S is adequate for good growth and color response and 3.45 pounds may be slightly above optimum.

X-ray spectographic analyses have shown significantly higher levels of tissue S from plots receiving S than those without S at the same N-P-K treatment. Tissue S increased also with increasing S levels.

The significance of the above discussion is that continual

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removal of clippings stimulated by high levels of N can result in S deficiency unless fertilizers contain adequate amounts. These plots received N from urea, P from phosphoric acid, and K from muriate of potash, hence, essentially no S is applied as fertilizer impurity.

Effects of S on *Poa Annua*

A significant reduction in *Poa annua* populations was observed in all plots that received 3.45 pounds S regardless of N and K levels. The most significant *Poa annua* decrease was noted in plots receiving 6 pounds N as compared to 12 and 20 pounds N.

Phosphorus is an important element for the development of *Poa annua*. All plots receiving P, regardless of N, K and S levels, had higher populations of *Poa annua* than those without P. Plots that received 1.15 pounds S had higher populations of *Poa annua* than those receiving 3.45 pounds at all levels of N, P, and K. It appears that 1.15 pounds S provides the greatest stimulus to growth and color of both bentgrass and *Poa annua*. The highest populations of *Poa annua* were recorded from all N and P treatments. Plots receiving 1.15 pounds S without P at all N levels had less *Poa annua* than those receiving P.

Effects of S on Disease and Winter Hardiness

All plots receiving S had less *Fusarium* patch caused by *Fusarium nivale* than those without S, regardless of N, P, and K treatment. Plots that received the highest N levels, in general, had more disease than the lowest N plots. The mode of action of S in this case is not well understood, but may be related to a direct effect on the fungus itself or the increased formation of S containing substances which may make the plants more resistant. No *Ophiobolus* patch disease, caused by the fungus *Ophiobolus graminis* var. *avenae*, has been observed in any of the S treated plots, but does occur in some plots without S.

Increased resistance to low temperature injury was noted during one winter. The winters in western Washington are usually wet and mild, but occasionally temperatures fall below 15 degrees F. accompanied with wind and no snow cover. After one such winter, all plots receiving S showed less scorching and greened up much faster than those without S. This is in agreement with statements made by Beaton (1) regarding the effects of S on structural characteristics of protoplasm.

The Effects of S on Soil PH

Sulfur does increase soil acidity (lower pH) through reactions in the soil. Annual applications of 3.45 pound S per 1,000 square feet lowered the pH in some plots from 5.6 to 4.8 over a period of seven years. There was no noticeable effect from the lowered pH, and as pointed out previously, turfgrass quality was best in all plots receiving S. It should be pointed out that applications of 20 pounds of N per 1,000 square feet from urea without S reduced pH much lower than 12 or 6 pounds of N with the highest S rates. No time has been applied to any of these plots since the research began; although calcium levels have fallen to as low as 1 meq. per 100 gm of soil, there is no plant evidence of calcium deficiency.

Conclusions

Several important conclusions can be drawn with regard to sulfur applications to putting green turf as related to the conditions of this test.

1. Increased color, vigor and nitrogen utilization.
2. Highly reduced populations of *Poa annua* at the highest levels of S without regard to N, P, or K.
3. Low S levels (1.15 pounds per 1,000 square feet) caused an increase in *Poa annua* and general turf vigor.
4. Additions of P in excess of minimum maintenance requirements increased *Poa annua* in all treatments.
5. Decreased incidence of *Fusarium* patch disease and complete elimination of *Ophiobolus* patch disease.
6. Reduced earthworm activity.
7. Elimination of black algae.
8. Increased cold and desiccation tolerance.

Sulfur investigations are continuing and it is hoped that more specific reasons for S activity can be clearly defined. Golf course superintendents have been advised to proceed with some caution since variable soil conditions, other chemical programs, and management practices may influence results.

We acknowledge with gratitude financial assistance provided by the USGA Green Section to aid in this research and advice and observations from Drs. C.J. Gould and S.E. Brauen.

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SEMINARS—A NEW AVENUE TO GCSAA RECERTIFICATION

Certified Golf Course Superintendents may retain their certification status by successfully completing three GCSAA sponsored seminars, according to newly approved procedures for the program.

At the Spring Meeting the Executive Committee revised previously adopted procedures which limited the application of seminar attendance to only one event, or two points, when a total of six are required. Recognizing that recertification needs of educational advancement can well be met via continued seminars, the Committee rescinded its previous decision in favor of complete recertification through seminar completion. This new avenue of maintaining recertification will become effective immediately.

Director of Education Bill Knoop continues to review the status of all certified members and will advise them of their needs to apply for recertification.

Credit: National News, September, 1976

CALIFORNIA'S MONTEREY PENINSULA WILL BE SETTING FOR GCSAA PRE-CONFERENCE TOURNAMENT

February 3 and 4, 1977, are the dates for the 1977 GCSAA Golf Tournament. Participants will play Monterey Peninsula Country Club's Dunes Course and Spyglass Hill—both famous for their beauty and uniqueness. The 36-hole stroke play is open to GCSAA members, exhibitors, club officials and guests of GCSAA members. Women's play will be February 3 on the Rancho Canada Golf Club.

Complete information including advance registration forms will be found in the forthcoming Conference Brochure. In brief, check-in will be Wednesday, February 2 from 9:00 a.m. to 6:30 p.m. at the Monterey Holiday Inn—Tournament Headquarters. Housing for participants will be at the Holiday Inns in Monterey and Carmel. The Victory Banquet for awards and prizes will be February 4 at the Monterey Holiday Inn.

Make plans now to enter and choose your members for the Chapter team competition.

Credit: National News, September, 1976



Tony Urbanowicz, center, receiving the trophy for low gross from Al and host golf professional, Harry Montevideo.

GCSAA LEARNS EPA HAS LIFTED BAN ON MERCURY FOR WINTER DISEASE

Apparently, a settlement has been reached between the EPA and Manufacturers of pesticides containing Mercury—with Golf Superintendents coming out the real winners! Use of pesticides containing mercury were reinstated for control of winter turf diseases with two restrictions: (1) its use will only be allowed by professional golf superintendents or persons under their supervision; and, (2) it cannot be used within 25 feet of water where fish can be taken out for human consumption. The settlement provides for producers to phase out manufacture of mercurial pesticides used to treat summer golf turf diseases.

The easing of the ban is particularly noteworthy because of the active role played by many local chapters, GCSAA's Governmental Relations Committee and the Industrial Advisory Council. Petitions and letters expressing the superintendents reasons for opposition to EPA's initial ban were instrumental in bringing about the revised policy. This is yet another example of the important role your professional associations can and do play in speaking on the issues of the turf industry and turf management.

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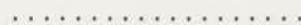


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