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By the Editor: The following article was primarily written by Vaclav J. Zolman who is the Chicago area representative for the Brookside Laboratories, Inc., New Knoxville, Ohio. He is a native of Czechoslovakia, coming to this country some eight or nine years ago. He has much to say but it is difficult for him to communicate. I have taken this opportunity to present a subject that should be reconsidered on his behalf.

Golf Course Operations Issue — November 1964:

"' . . . . USGA Midwestern Section Agronomist James Holmes says that Pythium blight and other fungi killed up to 75 percent of the fairways." . . . Hardest hit courses were in the Chicago and Minneapolis-St. Paul areas . . ." Curiously it was the **better courses** with the big maintenance budgets that suffered the most! ! !

The Golf Course Reporter — September-October issue, 1964:

" . . . . Never has the Chicago area experienced such generalized golf course troubles in turf maintenance. Fairways were hardest hit, but many courses had problems on greens and tees as well . . . ."

" . . . . Turf-Grasses lose vigor, are severely weakened and fail to respond to even maximum maintenance. Consequently, a myriad of pathogens such as diseases causing fungi become damaging . . . ."

" . . . . To date we are not aware of any positive control once Pythium sp. has become established. Golf Course Superintendents have been and are trying **everything** to stop the spread of this turf killer, but the prognosis is poor. . . ."

" . . . . Please, not only be patient with your Superintendent, but develop some real compassion for him. Unless you have been a golf course Superintendent, you will never know the extent of his anxiety and frustration . . . ."

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PROTECTION OF TURF AGAINST DISEASE THROUGH PROPER NUTRITION AND ITS ADVANTAGES FOR GOLF COURSE MANAGEMENT

By Vaclav Zolman

During the past few years every branch of industry has moved from pioneering experiences to the adoption of modern, scientific production methods. This same development accurred in the Golf Course Maintenance industry.

Dark green and beautiful turf was based on empirical experience in the past. Now, it requires engineering, scientific knowledge and artistic ability on the part of the Superintendent. Nutrition of grasses and the battle against so-called "diseases" is based today on scientific principles. Most soil testing today is based on primitive knowledge of the soil. Many of these tests are different, inaccurate and expensive (if you make a mistake). There are complete quantitative analysis of soils available. The latter method is accurate, adequate and necessary for the maintenance of vigorous and healthy turf, especially for very sensitive greens on golf courses.

A. Efficient Program for Golf Courses Based on the Complete Quantitative Soil Analysis.

1) Samples of soil from each tee, fairway and green separately are taken scientifically by specially trained personnel.
2) The results of quantitative soil analysis helps to answer golf course problems.
3) The soil analysis performed in modern laboratories, for major and minor elements and other important factors for the growing plants (grasses).
4) Scientific report based on the results of analysis and the requirements of different grasses includes a general project and recommendations for adequate treatment.

B. Based on the Report of the Analysis and the Resulting Recommendations a Practical Program Should be Made For the Golf Course Including:

1) Set up machines for limited amounts of various kinds of fertilizer mixtures (nutrients):
   a-Hand machines for greens and tees.
   b-Large tractor drawn machine for fairways.
2) Fertilizing plan for the golf course with timetables for soil, grass requirements and seasonal variations:
   a-greens = size, amount fertilizer/a. and time.
   b-fairways = size, amount fertilizer/a. and time
   c-tees = size, amount fertilizer/a. and time
3) Purchasing plan for fertilizers per year (kind, amount, price per unit, etc.
4) Top-dressing plan for greens—material must be analyized and balanced.
5) Water Analysis.

C. Advantages Resulting From the Complete Quantitative Soil Analysis and Treatment.

1) Elimination or Limitation of "Diseases"

a—Elimination of "diseases" from deficiences and harmful excesses of major elements and either high or low pH.

b—Elimination of "diseases" from deficiencies and toxicities of minor elements.

c—Elimination of "diseases" which have origin in backward effects of sprays and other chemicals.

d—Recovery of vigorous growth of grasses by balanced nutrition and rebuilding of the physiological defense of grasses against infectious diseases and fungi.

e—New strains of diseases and varieties of fungi such as the new variety of Pythium sp. would find it more difficult to survive if proper nutrition was practiced resulting in healthier plants which would be more resistant.

2) Direct Financial Advantages Resulting From Practical Program.

a—Eliminating expenses for labor and fertilizers which increase deficiency and toxicity of certain elements in the soil or influence unfavorable pH, as well as nutrients which are in excess in soil and do not contribute to a vigorous growth of grasses.

b—The most economical investment is realized for labor and acqusition of fertilizers for elimination of deficiencies or toxicities and balance of pH through proper nutrition of the grasses on certain tees, greens and fairways.

c—Expenses for sprays (chemicals) and labor are actually decreased because diseases are eliminated or limited.

d—Considerable savings are realized because rebuilding of greens and tees are not necessary, with the exception of greens that are poorly located, poorly constructed or absolutely ruined.

e—The highest financial profit results from a better turf which attracts more golfers on the course.

D. Quantitative Soil Analysis or Rebuilding of Course

Expensive, new, rebuilt, or renewed golf courses are worthwhile to take under control because the danger of diseases, fungi, winter injuries, etc., exists in unbalanced soil environment. Law of the minimum and harmful maximum remains the same for new golf courses and greens.

Maintaining a beautiful golf course is possible either by complete soil analysis with proper treatment, or, by rebuilding to change the basic soil environment. However, the cost of performing a complete soil analysis is only a fraction of the cost of rebuilding a green. Therefore, the expense for soil analysis is the best and most profitable investment in golf course business.

There are many things which add to the attractiveness and beauty of golf courses, as an example, the irrigation system, decorative trees and flowers, to name a few. However, the control of soil environment (by means of quantitative soil analysis) is basically essential for a green, healthy and vigorous turf which attracts golfers. Maintenance of a golf course at the top level of attractiveness is quite difficult and requires engineering skill and artistic aility based on scientific principles and natural laws — an immense responsibility for golf course Superintendents in the atomic age.