the golf course TRADES company spotlight

Soil Technologies Corp, the pioneer of microbial-based products.

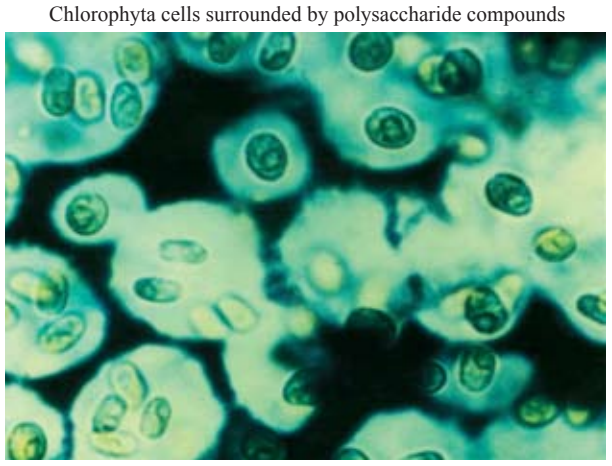
Soil Technologies Corp. (Soil Tech) is a pioneer in the development of microbial-based products for turfgrass and agricultural applications. Soil Tech's products evolved out of research projects originally conducted by N.A.S.A. (National Atmospheric and Space Administration) scientists during the 1960's. While working to create a food production system for extra-terrestrial space explorers, much attention was focused on the use of microorganisms to 'manufacture' biochemicals that could be used as food, fertilizers and/or pest controls.

Soil Tech founder/agronomist, Dr. Jim Schaefer became fascinated by this concept. In 1982, Dr. Schaefer began discussions with professors at Iowa State University to try to determine the practical uses of microorganisms in agriculture. By 1983, Dr. Schaefer had formed Soil Technologies Corp. as a research and development company with the purpose of creating biological production systems for farmers.

During 1983, Dr. Fred Williams, Chairman of the Microbiology Dept. at Iowa State Univ., was contracted by Soil Tech and began exploring the agronomic utility of polysaccharide producing microbes. Dr. Williams first quantified the production of these polymers by chlorophyta organisms. To his surprise, he observed that these lowly soil microbes were able to produce up to 1000x to 2000x their cellular weight in polysaccharides. In practical terms, a few ounces of chlorophyta would 'manufacture' 300-400lbs. of polysaccharides. When grown on the soil surface, a crop of chlorophyta could quickly (30-60 days) produce enough polymers to transform the soil structure, similar to the manner in which a farmer might plow down a cover crop to renovate his soils. The 'microbial crop' provided a shortcut that was faster, easier and less expensive.

Illustration # 1

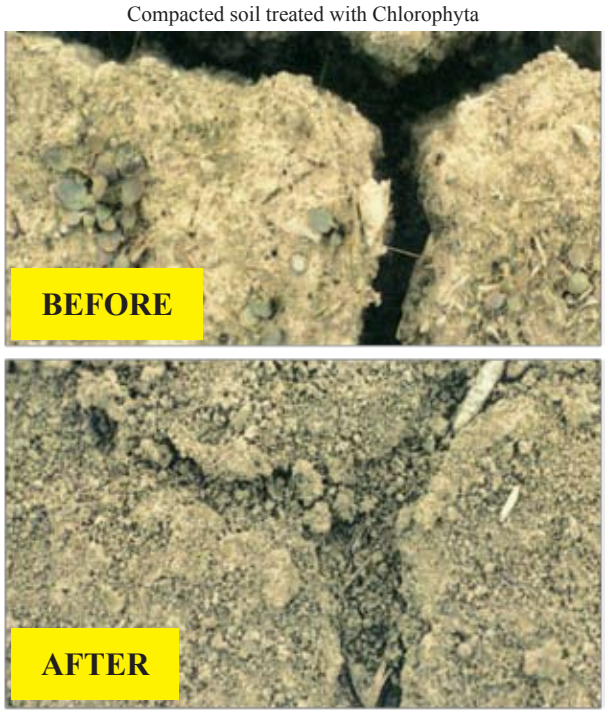
Chlorophyta cells surrounded by polysaccharide compounds



Among soil scientists, polysaccharides have long been known as 'nature's glue', for their fundamental role in the formation of soil aggregates (crumbs).

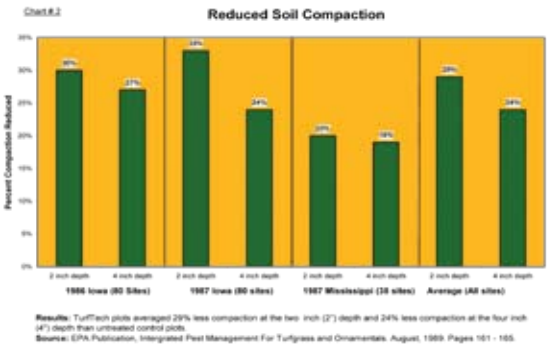
Illustration # 1A

Compacted soil treated with Chlorophyta



In 1984, Dr. Rick Cruse, a soil scientist from Iowa State University, published a paper showing increased crop yields and reduced fertilizer needs where the microbial system had been employed. In 1985, Microp® (for agricultural crops.) and TurfTech (for turf) were introduced in the market by Soil Tech.

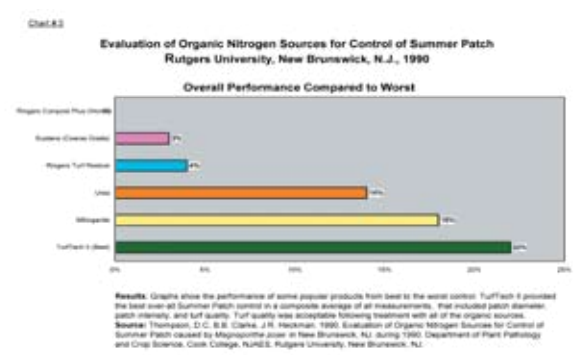
During 1986-1987, a wide-scale research project was begun to show the influence of TurfTech™ on soil compaction. The results of this study were published in August, 1988 in the E.P.A. book titled "I.P.M. for Turfgrass and Ornamentals," edited by Anne R. Leslie. The study concluded that TurfTech treatments could reduce soil hardness (compaction) by an average of 29% at the 2" depth and 24% at the 4" depth in a period of 6-8 months after application.



During 1987-88 a research project was begun at Soil Tech to develop a nitrogen-fixing soil inoculant that could be used as a bio-fertilizer. Dr. S.K. Goyal of the Indian Institute of Agriculture, a leading expert in the study of cyanophyta, collaborated with Soil Tech researchers to select specific strains of cyanobacteria that were then incorporated into the TurfTech product formula. The selected cyanobacteria were free-living soil colonizers that produced a bio-fertilizer effect of nearly one pound (1 lb.) of nitrogen/1000 sq, ft./season

Following the successful introduction of TurfTech in 1988, scientists at Michigan State Univ. began tests to determine the ability of organic fertilizers to inhibit fungal pathogens of turf. During 1989, M.S.U. plant pathologists reported that TurfTech had been effective in reducing Summer Patch and Necrotic Ring Spot by over 40% in treated plots.

In 1990, tests at Rutgers Univ. confirmed these results. An evaluation of organic nitrogen sources for control of Summer Patch showed that TurfTech provided the best overall control of all 17 organic nitrogen products tested. The composite average of patch diameter, intensity, and turf quality showed TurfTech performing consistently across all 3 categories. (See Chart Below).



On the international front, TurfTech was being investigated in Japan during 1988-1990. The South Japan Green Institute published reports in which TurfTech reduced soil compaction by 12-55%, improved water infiltration by 44-52%, increased root growth by 22-41%, and increased soil nitrogen content by 33%.

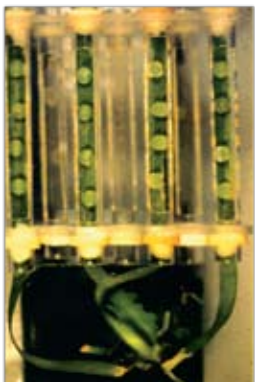
By 1990, Soil Tech had launched an R&D program to develop bio-fungicide products for turfgrass pathogens in co-operation with Dr. Nick Christians and Dr. Clint Hodges at Iowa State University. Soil Tech scientists began the screening process for bio-fungicide activity on several thousand bacterial strains. After narrowing the search to about 12 naturally occurring organisms, Dr.'s Hodges and Christians set out to determine the activity of these 'bio-fungicides' on two turf diseases: Dollar Spot (*Sclerotinia homeocarpa*) and Leaf Spot (*Bipolaris sorokiniana*). Several organisms showed good controls in the lab. (See Illustration #2).

Illustration #2

Evaluation of bacteria Isolates as Potential Biological Control Agents for Foliar Pathogens of Turfgrasses

A

B

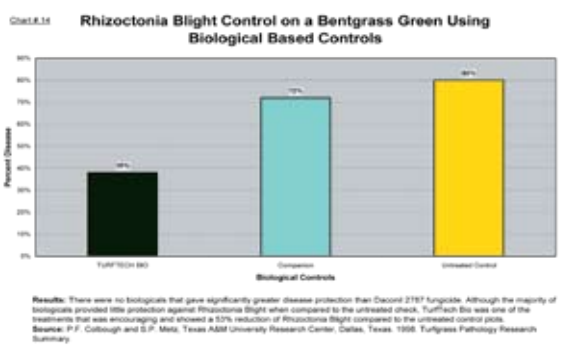


(A) Dollar Spot (*Sclero tinia homeocarpa)* of Kentucky blue grass (*Poa pratensis)*

(B) Bio-control by Bacteria on Dollar Spot (*Sclerotinia homeocarpa)* of Kentucky blue grass (*Poa pratensis)*

Investigators: Clinton F. Hodges and Nick E. Christians, Department of Horticulture, Iowa State university, Ames, Iowa, U.S.A, 1991

Over the next several years, and in cooperation with Scott Fertilizer Co.'s research scientists, field trials were conducted on the individual strains of bacteria. In 1994 it was concluded that in order to achieve a broad-spectrum effect on a wide range of pathogenic fungi, it would require a blend of multiple organisms. In 1998, several of the beneficial organisms were incorporated into the formula to create a new product, TurfTech Bio®. In tests at Texas A&M University, TurfTech Bio provided a 53% reduction of disease symptoms compared to the untreated plots.



These product technologies, developed by Soil Tech scientists over the past 25 years and utilized on thousands of golf course and sports field applications, provide an effective method for managing a variety of agronomic factors affecting turfs, while using sustainable technologies. The wide range of research findings and the consistently positive results has paved the way for turfgrass managers and horticulturalists to embrace TurfTech products with confidence.

For more information call 800-221-7645 or visit www.soiltechcorp.com.

SOIL TECH Professional Soil Bioinoculant

www.soiltechcorp.com