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Scanning the Journals

Fertilizer Effects on Microbes and Disease

Public concern regarding pesticide use continues to pressure the industry to develop non-chemical or organic pest control programs. In addition, there is growing interest in the use of organic fertilizers as a means of "enhancing" soil microbial activity. Only a few studies have explored the role of nitrogen and organic fertilizers with regard to the ability to suppress disease and the effect on microbial activity.

Researchers at the University of Maryland, led by Dr. Peter Dernoeden, conducted a study to investigate the influence of nitrogen fertilizer source on disease, leaf tissue nitrogen and soil microbial activity. This study was designed to supply equal amounts of nitrogen on an annual basis over a seven-year period. Fertilizer applications were made for four years prior to data collection.

Nitrogen sources included urea, sulfur-coated urea (SCU), Milorganite, Sustane Medium, Earthgro 1881 Select, Earthgro dehydrated manure, Ringer Lawn Restore, Com-Pro, and Scotts All Natural Turf Builder (ANTB). All treatments were applied at 1 lb. of actual N per 1000 square feet in October, November, December, and May for a total of 4 lbs. N per 1000 square feet for the season to a creeping bentgrass (Southshore) fairway turf.

There is an enormous amount of data reported from this study that includes the lack of season-long control of dollar spot regardless of treatment, the lack of effect on soil microbial activity, and the low correlation between tissue N level and dollar spot severity. Still, when disease pressure was low to moderately severe, Ringers Lawn Restore provided commercially acceptable dollar spot suppression, yet the compost products Com-Pro and Earthgro in most cases enhanced dollar spot development. It was speculated that carbon from wood bulking chips may have inhibited N release or provided a food source for the dollar spot organism.

The researchers concluded that any mechanism of dollar spot control from organic or synthetic organic materials is more likely related to nitrogen availability as they observed no meaningful microbe response. Much needs to be learned about the role of fertility on turfgrass pest management and this study lays an excellent foundation for future research.

From: Davis, J.G and P.H. Dernoeden. 2002. Dollar spot severity, tissue nitrogen and soil microbial activity in bentgrass as influenced by nitrogen source. Crop Science 42:480-488.

Alleviating Heat Stress

Cool season turfgrasses experience growth reductions under warm summer temperatures due to a variety of physiological factors. Most notably, there is reduced energy production from photosynthesis and significant energy consumption to replace growth removed by mowing. Much of the research in the last several years in this area conducted by Dr. Bingru Huang, formerly at Kansas State University and now at Rutgers University, has identified the role of root growth on summer decline.

The most recent studies conducted in Dr. Huang's lab have explored mechanisms of enhancing heat stress tolerance. Specifically, two studies were published that investigated the role of cytokinin (a plant hormone produced in roots) applications on heat stress tolerance.

Several rates of cytokinin delivered as zeatin riboside were applied to Penncross creeping bentgrass growing under fluctuating air and soil temperatures from 70° to 90°F. During the experiments conducted in a growth chamber, the plants were allowed to acclimate, then exposed to the heat stress conditions, then the rootzone was injected with the cytokinin treatment.

Results identified subtle alteration in leaf decline and cell membrane integrity most likely related to increased antioxidant production thought to be stimulated by the cytokinin treatment. Additionally, a companion study observed less reduction in turfgrass quality and shoot extension in heat stressed plants treated with the high rate of cytokinin.

These results add much to our understanding of how plants respond to heat stress and how possible reduced levels of cytokinin in the roots might be involved. However, one should exercise caution in extrapolating these results into field situations based on product variability and the dynamics of a managed turfgrass system.

From: Liu, X. and B. Huang. 2002. Cytokinin effects on creeping bentgrass response to heat stress. In two parts: Shoot and Root Growth and Leaf Senescence and Antioxidant Metabolism. Crop Science 457-471.

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Turfgrass Industry Survey

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your allied associations to provide financial support for the industry contribution and fill out the survey when it arrives this Fall. I hope we can count on you!

Overview

Turfgrasses represent one of the more important interfaces where people and plants come together, directly impacting the quality of human lives. Rough industry estimates extrapolated from the 1977 survey suggest that in New York State close to two million acres are covered with turfgrasses, consisting of lawns, parks, golf courses, sod farms, industrial and institutional grounds, rights-of-way, etc. About 321,000 acres of residential and commercial lawns are managed by lawn and landscape services. Of that acreage, approximately 50 percent lies in downstate New York (Westchester, Rockland, Nassau, and Suffolk Counties), where the landscape industry has traditionally been very strong. The approximately 800 golf courses in New York State cover at least 80,000 acres of intensively maintained turfgrass, again concentrated throughout urban areas of the state. In addition, there are over 200,000 acres of highly maintained turf and lawns in parks, public and private institutions, schools, cemeteries, and airports. The rest of the two million acres of turfgrass are lower maintenance areas, such as highway medians and the residential lawns or commercial grounds not serviced by the lawn care industry. Yet, while land estimates can be calculated, there is no current information available on the contributions of the turfgrass industry to the economy of New York State. The old data from 1977 estimated from $313 million to $595 million for total maintenance expenditures.

Several states (IA, WI, VA) have been attempting to determine the economic contributions of the turfgrass industry. Recently, the Virginia Agricultural Statistics Service, in partnership with the Virginia Turfgrass Council, reported a 66% increase in turfgrass acreage from 1982 to 1998, with a concomitant 400% increase in maintenance expenditures that exceeded $1.5 billion. This surpassed the combined cash receipts of all major agricultural commodities combined! Furthermore, in Virginia—a state barely 20% the size of New York—the industry created over 390,000 jobs with an annual payroll of $700 million. Finally, the Virginia study indicated that approximately $85 million was spent on goods, services and individuals outside the state. Therefore, a comparable analysis of the turfgrass industry in New York would fulfill a need to evaluate and assess the magnitude and economic potential of this important service sector industry.

The Project

Total maintenance expenditures for the New York State turfgrass industry was estimated to be between a $313 and 595 million in 1977. Since then no meaningful economic assessment of this important industry has been attempted. Therefore, the contribution of the turfgrass industry to the economy of New York and the opportunity for continued economic expansion cannot be fully understood or capitalized on until a thorough economic analysis is conducted. Consequently, the objective of this project is perform an economic survey of the turfgrass industry in New York.

The New York Turfgrass Economic Analysis (NYTEA) will be the centerpiece of an effort to capture the magnitude of the industry by assessing the overall amount of turfgrass acreage, including an analysis by sector, i.e. golf courses, sod farms, parks, schools, home lawns, athletic fields, and the like. Additionally, total expenditures for turfgrass maintenance that will include such items as paid labor, costs of establishing new turf areas, equipment, supplies, crop protectants, among others, will be calculated. Finally, an educational needs assessment that would aid the state agencies responsible for regulation will determine major turf problems, formal training programs and primary sources of information.

The NYTEA will highlight employment opportunities in the turfgrass industry that might not otherwise be known, identify opportunities for investment in new technologies, such as turfgrass seed production and compost operations, and attract allied industry investment in a state with significant economic resources allocated to turfgrass maintenance.

Objective

The objective of the NYTEA is to provide basis statistics that describe each of the individual industry segments (home lawns, highway roadsides, golf courses, sod farms, general areas, airports, athletic fields, cemeteries,

Industry surveys conducted in other states have resulted in substantial additional financial and legislative support from state governments. In some cases, several hundred thousand new dollars have been allocated to turfgrass research and education. This is a vital time for New York to invest in turfgrass research focused on environmentally responsible management.

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Your participation in a new turfgrass industry survey this Fall will help the process and could yield significant additional resources. I hope we can count on you!

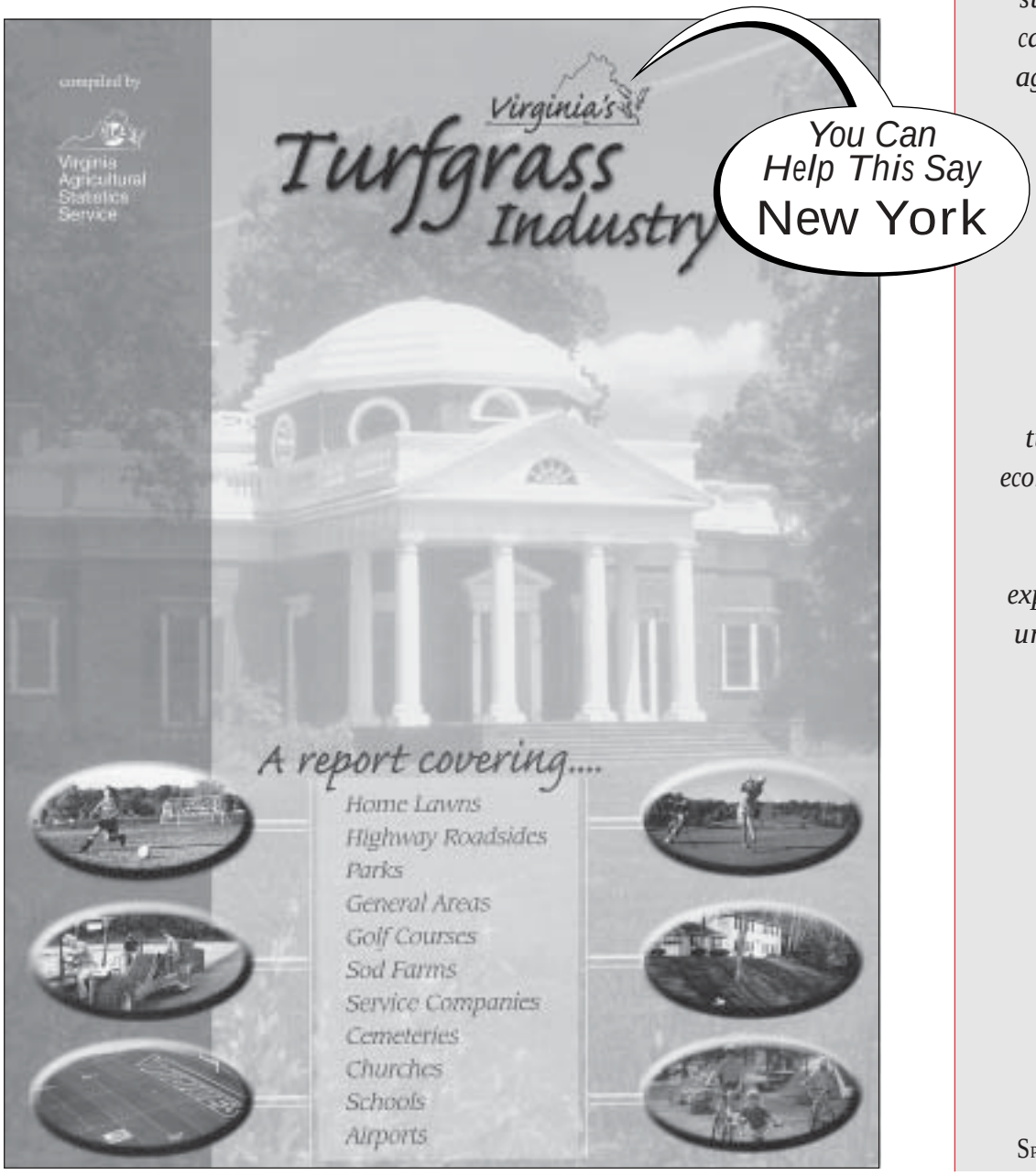
churches, parks, schools, and service companies) for:

- number of hired workers
- value of unpaid family labor
- equipment expenses
- non-equipment expenses
- paid labor expenses
- maintained acreage of turf
- capital improvement expenses

The NYTEA will deliver a comprehensive document that will serve as a basis for continued economic expansion (employment, equipment purchases, etc.) and investment in new technologies. In addition, this economic analysis will be useful for state agencies responsible for regulation by providing a more thorough understanding of the various expenditures, employment opportunities, and challenges facing New York's turfgrass industry.

It is safe to assume that based on the brief 1977 economic analysis of expenditures for turfgrass maintenance in New York and the recent publication of the Virginia Turfgrass Industry Survey that New York's turfgrass industry constitutes a multibillion dollar economic resource. It likely employs hundreds of thousands of citizens, utilizes taxable resources, and significantly supports local communities through tax revenue. Yet, without a properly implemented assessment, the understanding of this industry, as well as opportunities for growth, cannot be realized.

Frank S. Rossi



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