LAWN INSTITUTE

Harvests

Volume 30 Number 1 April 1983

CONTENTS

THE HARVEST MIX

(AN INTRODUCTION TO THIS
ISSUE OF HARVESTS)

This issue of Harvests, Volume 30 Number 1 (April 1983) presents a mix of current thinking and perspectives concerning turf and lawngrasses. The Director's Dialogue is dedicated to the issue of continuing funding for turfgrass research at our major agricultural experiment stations in the United States and abroad. The Musser International Turfgrass Foundation has a proposal that will be implemented this summer. It will require a broad base of support. You can help provide this support.

The most important outcome of turfgrass research is a continuing Quest for Quality. This is the topic considered under LIP (Lawn Institute Pitch). The focus is on lawn seed. Also, selected research reports presented at the Golf Course Superintendents Association of America 1983 Education Program are highlighted in the section "Association and Society Reports". Under "Readers Forum" you will note brief discussions of five new research areas of investigation that have the objective of keeping new information in tune with needs for the 1980's.

"P.O.Box 108"identifies some of your thoughts on Harvests and related turfgrass topics and our"Quarterly Program Report"and "Itinerary"tell a bit about Lawn Institute activities during the first quarter of 1983. "A Look Ahead" will indicate Lawn Institute activity during the second quarter of 1983.

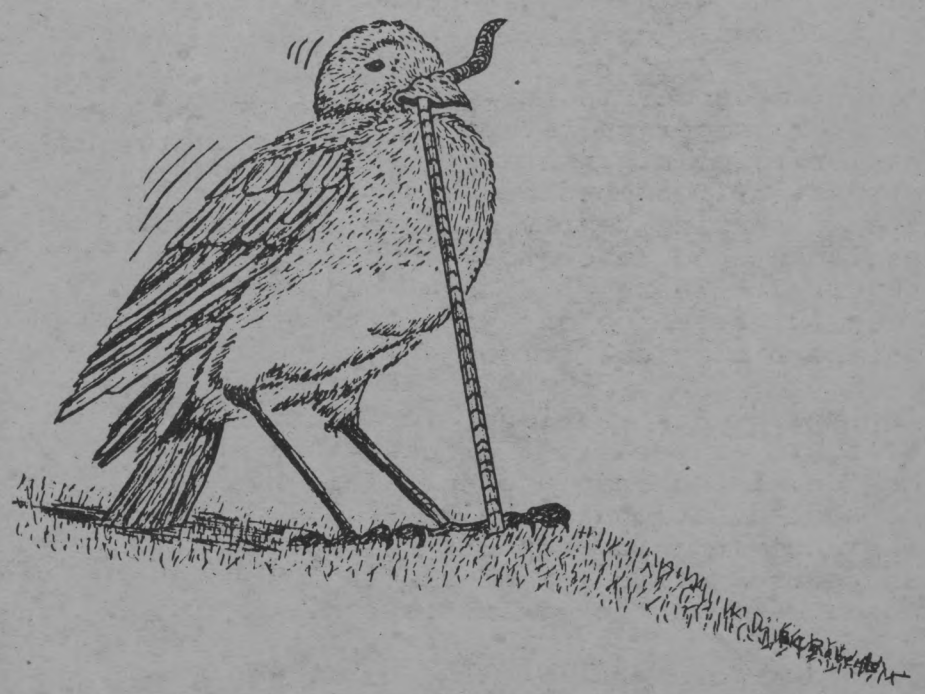
"Research Synthesis" draws on recent presentations at both GCSAA and Purdue Conferences and on an analysis of the value of turf to the Rhode Island economy by Dr D Thomas Duff. "How Green is Green" is a start in getting us thinking about the dollar value of lawns and turf. There's a lot of grass out there and a lot of data relative to its worth. What's it all mean ?

The "Threshing the Journals" and "Score Card" sections will be featured again in the next issue. At that time, "Score Card" will be devoted to a review of selected presentations from the 1983 Midwest Regional Turf Conference. Dr Bill Daniel and Purdue University both have outstanding reputations in the field of Turfgrass Education and we rate them at the top of our score card.

We look forward to keeping in touch with you through our quarterly newsletter, Harvests.

"If Spring came but once in a century instead of once a year, or burst forth with the sound of an earthquake and not in silence, what wonder & expectation there would be in all hearts to behold the miraculous change."

– LONGFELLOW



Director's Dialogue

(EDITORIAL ON LAWN INSTITUTE
AND RELATED TOPICS)

FUTURE TURFGRASS RESEARCH FUNDING

A Proposal From the Musser Foundation

Agricultural experiment stations, the US Department of Agriculture and private industry have all been supportive of turfgrass research needs. During the past fifty years great progress has been made and today we enjoy improved grasses that are established and maintained more efficiently and effectively with modern equipment, fertilizers and pest control chemicals. But we have just scratched the surface.

Recent advances in turfgrass science point to even better cultivars that will be easier to maintain and better adapted to stress environments. Costs of new research are increasing yearly as more sophisticated equipment and laboratory apparatus are required. Where will funds come from to keep our research on a par with other areas of the biological sciences ?

The Musser International Turfgrass Foundation has an idea that already this spring has developed into a plan. This has been presented nationally by Dr Fred V Grau and is receiving wide support as a practical and sound method for generating turfgrass research funds for years to come.

In order to appreciate the plan, you will want to know something about the Musser Foundation and why this organization is in a unique position to provide funding leadership through the close of this century. Then review the plan and note its simplicity and workability.

The Musser International Turfgrass Foundation

Professor H B Musser, Pennsylvania State University Turf Seed Agronomist was developer of Penncross bentgrass and Pennlawn fescue, author of Turfgrass Management and a noted educator. The Musser Foundation was formed fifteen years ago as a tribute to his research accomplishments and industry wide leadership.

In addition, the Foundation honors the memory and the accomplishments of all those pioneers who have built a firm foundation for the turfgrass sciences of today. The future is brighter because of their leadership which has inspired us to carry the banner of Better Turf for All. As these men made an investment in the future, now the Foundation continues to perpetuate their philosophy. This is accomplished by establishing research Fellowships at leading institutions of higher learning.

What is a Fellowship ?

A Fellowship is a money grant so that a student can devote full time to designated research and to classroom work. The obligations are heavy. Library research is required so that one learns from the research of others and so that duplication of effort is avoided. A detailed research project is pursued under close supervision by the major professor. The written thesis must be defended in an oral examination and the proficiency of the candidate confirmed before the degree (Master of Science or Doctor of Philosophy) is granted.

Fellowships support turfgrass research which by definition is a studious inquiry and investigation designed to discover facts and to explore the unknown. Generally, Basic Research is emphasized. Thus, attempts are made to learn new and original things and to discover WHY turfgrasses grow as they do. In Applied Research , attempts are made to learn HOW to grow turfgrasses and WHAT it takes to make them grow best.

The Musser Foundation directs its financial aid towards Fellowships which are committed to Basic Research. Most Fellowship grants are applied to Doctor of Philosophy studies. In this way, leaders are trained, the world's turfgrass literature is enriched and we assure the future of Applied Research by continually providing highly skilled scientists to do this work.

Selection of Candidates for Fellowships

Gifted individuals at any recognized turfgrass research facility, anywhere in the world, who are dedicated to careers in the many facets of turfgrass science and culture are eligible for Musser Fellowships. Consideration is given to students seeking advanced graduate degrees and to post-doctoral candidates. Applicants and projects are screened by a research and education committee of the Foundation comprised of university educators.

Musser Foundation Leadership

The active proponents of the Musser Foundation are a diversified group of individuals sharing the common goal of improving our environment for better living and recreation through use of turfgrasses. Through personal involvement, each recognizes that improvements for lawns, roadsides or playing fields are dependent upon knowledge gained through research. Boards of Directors and Advisors include forty six of the world's turfgrass business, research and education leaders. Their experience has shown that leadership is essential to progress; that the turfgrass industry has reached its current advanced state because of informed, dedicated leaders; and that the biological and agronomic complexities inherent in turfgrass management demand extraordinary education and training. They support the essentiality of having a continuous succession of highly trained teachers and scientists under whose expert guidance turfgrass managers will be better able to face the future with confidence.

Investment of Funds

The Musser Foundation is a nonprofit organization with tax exempt status. All monies raised by or contributed to the Foundation are invested to become self-sustaining. Only the interest generated by the principal is used for Fellowship grants.

Examples of Research Investigations

Four major areas of investigation have been supported with Musser funds to date:

- -in Ohio: Black Turfgrass Ataenius beetle life history and control;
- -in New York: Etiology of Fusarium on bluegrass and its control;
- -in Pennsylvania: Microclimate studies on turfgrass;
- -in Texas: The physiology of moisture stress and drought tolerance in turfgrass.

Musser Foundation Funding

Four methods are available for generation of Musser Foundation funds:

- the first involves "Musser Tournaments" that are sponsored by golf clubs who contribute the proceeds to the Fellowship Fund;
- the second involves a "Memorial Fund" that is maintained to honor those who have been creative in turf work;
- the third involves "Free-will Contributions" that are welcomed at any time from anyone or any firm wanting to help assure the future of better turf;
- the fourth involves "Musser Golf Days" and is a new plan with many unique features.

Musser Golf Days

Among the millions of golfers, there are many who rarely get the chance to play on some of the world's finest courses. These golfers would gladly pay a special fee for this opportunity. With a cooperative agreement between these private clubs and The Musser Foundation, this opportunity can be provided one day a year with the proceeds contributed to support turfgrass research.

The following details are important in the implementation of this plan -

First- This is not a tournament. There are no frills, no food - just golf. Arrangements and publicity (invitations, if desired) would be wholly in the capable hands of the Golf Course Superintendent and Club Professional. They would set the fee and collect the money.

Second - No cost to the club would be incurred other than that related to normal use of the course one more day each year. Many private clubs are closed on Mondays and perhaps one such Monday could be reserved for Musser Golf Day in support of turfgrass research. The Golf Course Superintendent and Professional would want to obtain maximum publicity for the event which would be featured as an opportunity for all to enjoy a game of golf and at the same time contribute to better lawns and sports turf for all. This could be an opportunity for interested club members to play with paying guests. All should be informed of the urgent reason behind this fund raising effort; i.e., that lawngrass and turf research funds are inadequate for the 1980's. This project is dedicated to improving lawns and turf without increases in state and federal taxes. Golfers are all gardeners to some degree and their help through the Musser Golf Day across the entire country can have great significance.

Third- The golf course Superintendent and Club Professional are key people in the Musser Golf Day plan. They, with club endorsement, plan, supervise and are responsible for regular course services and conditions during the period allotted for play. They see that normal club standards for play and deportment are adhered to. The day of play would be set by the Superintendent and Professional for maximum income and minimum inconvenience to club members who are making a donation to turf research by sharing play with others on this day.

Fourth - Money raised from Musser Golf Days would be divided 50/50 with the local turfgrass organization that traditionally makes research grants to the state experiment station (Land Grant University). The Musser Foundation would retain its 50 % share to build the Fellowship Fund which earns income used to finance graduate turfgrass research.

Fifth- The Musser Foundation will provide a memorandum of understanding between the club and the Foundation. It will specify such items as: date and time of the event; individuals responsible for planning and implementation of the Golf day; local turfgrass association to receive a 50 % share of the income; and outline other areas important for the smooth conduct of the event.

Sixth - The Musser Foundation will provide public relations material for news releases. This copy will be in news format ready for the club with space provided for appropriate recognition of officers, Professional and Superintendent.

Seventh - A certificate of appreciation will be provided by the Musser Foundation for each golfer. In addition, a special certificate of recognition will be presented to each club by the Golf Course Superintendent.

Eighth - Musser Golf Days may be planned as an annual event. The concepts of harmony, coordination and cooperation also will be well served. No longer will various groups need to be apprehensive about imagined loss of identity. By their support of this international plan, each group will be recognized and enjoy enhanced stature and credibility. The entire turfgrass industry can join the golfing public in a united effort in behalf of lawns and sports turf.

Here's How You Can Be Involved

- You can be instrumental in arranging for a Musser Golf Day.

Turfgrass research specialists
extension educators
professors
industry leaders
Golf Course superintendents
professionals
managers
greens chairmen
club members

- Contact the golf course Superintendent and club Professional at the course to be considered for the event.

- Explore the possibility of scheduling a Musser Golf Day as just described.

- The Superintendent and Professional will meet with the club board of directors through the greens chairman and the golf chairman. They will request that the club donate to turfgrass research, not by giving funds, but by donating use of the course to outside non-member play for one day or afternoon a year for a fee.

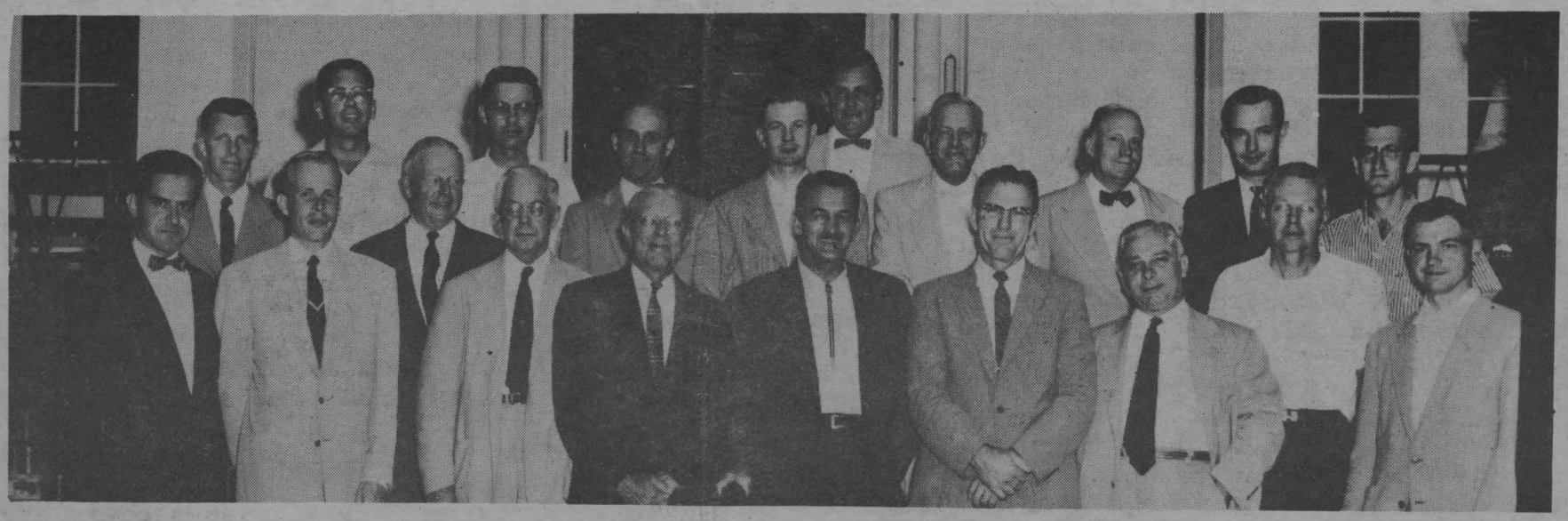
- Following club approval, the detailed organization and conduct of a Musser Golf Day will yield unending satisfaction for all concerned and a debt of gratitude from turfgrass scientists near and far away.

For More Information

Dr Fred V Grau, President of The Musser International Turfgrass Foundation will send additional information and forms to you upon request. Write today to:

P O Box AA
College Park, MD 20740-1014

or call 301/864-0090.

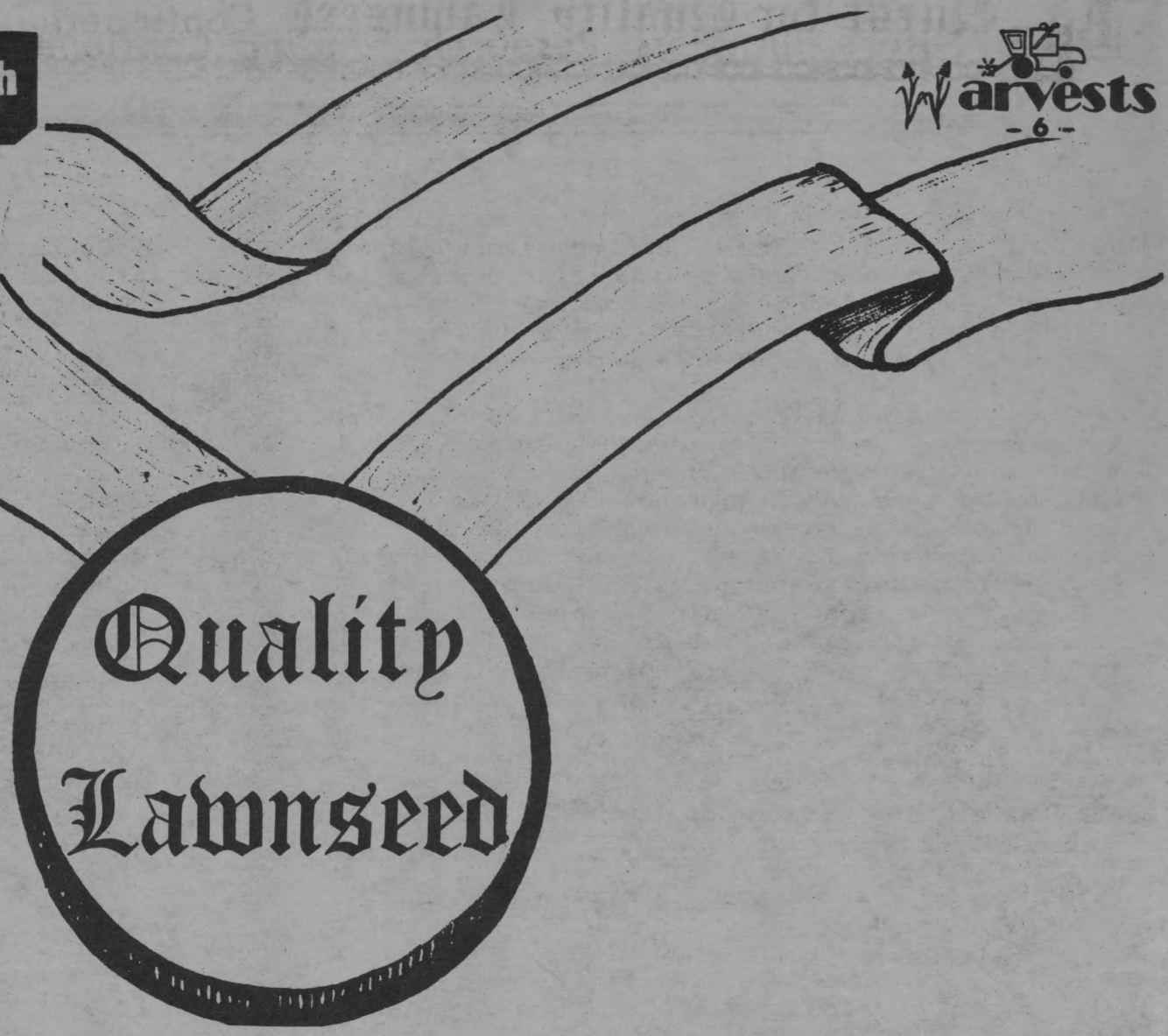


A MEETING OF UNIVERSITY AND INDUSTRY TURFGRASS SCIENCE LEADERS IN THE NORTHEAST WAS HELD IN THE MID 1950's AT THE UNIVERSITY OF MASSACHUSETTS. KEY PLANNERS FOR THE FUTURE WERE: PROFESSOR BERT MUSSER JUST LEFT OF THE CENTER RAILING AND DR FRED GRAU JUST TO THE RIGHT. TO THE LEFT OF PROFESSOR MUSSER IS PROFESSOR LAWRENCE DICKINSON, WITH O J NOER TO THE LEFT AND IN BACK OF DICKINSON. TO THE RIGHT OF DR GRAU IS DR ROY BLAZER WITH DR JESS DEFRANCE TO THE RIGHT AND IN BACK OF BLAZER. OTHERS PRESENT AT WORKSHOPS SUCH AS THESE WERE PRIVILEGED TO BE PART OF THE DEVELOPMENT OF A RESEARCH PHILOSOPHY PERPETUATED TODAY THROUGH BOTH THE MUSSER INTERNATIONAL TURFGRASS FOUNDATION AND THE O J NOER RESEARCH FOUNDATION.

Lawn Institute Pitch

(CURRENT OUTREACH BY WAY OF THE WRITTEN AND SPOKEN WORD)

Quest for Quality Lawnseed



The genetic makeup or heredity that exists in turf and lawngrasses creates the potential for a dense, persistant cover that provides user satisfaction. A lawn can never become more than the potential that exists in each little seed. Without adequate care, even that potential may not be completely realized. Thus, starting with the best in lawnseed is the first step in the quest for quality.

During the past ten years, plant breeders in both public and private laboratories have been effective in the search for new turfgrasses. They have searched in old lawns, golf greens, parks, cemeteries and pastures the world over.

Natural selection under different environmental conditions has produced types with improved color, vigor, disease resistance, heat and drought tolerance and ease of maintenance. These selections have been evaluated and certain types combined to form synthetic cultivars while others have been crossed to form new hybrids. Through a range of plant breeding techniques from natural selection to genetic manipulation, new improved types are now readily available.

Despite the extensive effort and cost in the development of this new germplasm, the seed used in establishing a new lawn or in upgrading an old one by renovation is the least costly single item required in the total process.

The quest for quality also depends on having turf and lawngrass seed that has high germination and purity and freedom from weed seed and other forms of contamination. This doesn't just happen, but is possible because of the care that goes into the production of seed and into the cleaning, processing and testing of the product prior to marketing.

In the great seed producing areas of the country as much as 250,000 acres may be devoted to specialized turf seed culture in one region alone. Seed fields must be kept weed free and the grasses grown must be maintained true to type. Grasses are maintained to yield seed of high germination and this is cleaned and processed to be pure and free of seed from weedy type plants. Weeds that do become established in lawns come from seed in the soil and not from high quality lawn seed.

State and federal government lawn seed labeling requirements are designed to provide the landscaping public with all the information required in their quest for quality. Be sure to read the label on the package.

Finally, turf and lawngrass seed is available in a wide range of types. Some are relatively coarse in texture, others fine, others intermediate. Some are vigorous and persistant while others provide only temporary cover. Some are well adapted to local conditions while others may be very poorly suited to growth conditions within the marketing region. There is something for everyone and the price range is usually broad. This is consistent with marketing of most product lines.

In a quest for quality, search out turf and lawngrass types that feature the names of Proprietary Cultivars. These are the ones that will work hardest in the production of high quality lawns so that the gardener may work less and enjoy leisure time activities more. These are the ones that will adjust best to the microclimate within the region used.

The Lawn Institute Variety Review Board for 1982-1983 lists the following bluegrasses, perennial ryegrasses, fine leaved fescues, turf type tall fescues and bentgrasses. Become familiar with these names. They are the result of a quest for quality lawnseed throughout the world.

Kentucky bluegrasses

Adelphi	Fylking	Nugget
America	Glade	Plush
Arboretum	Majestic	Ram I
Birka	Merion	Sydsport
Bonnieblue	Merit	Touchdown
Eclipse	Monopoly	Vantage
Enmundi		

Perennial ryegrasses

Blazer	Fiesta	Pennfine
Citation	Manhattan	Pennant
Derby	NK-200	Regal
Diplomat	Omega	Yorktown II
Elka		

Fine leaved fescues

Agram	Highlight	Ruby
Banner	Koket	Waldorf
Ensylva		

Turf type tall fescues

Clemfine	Houndog	Rebel
Falcon	Mustang	

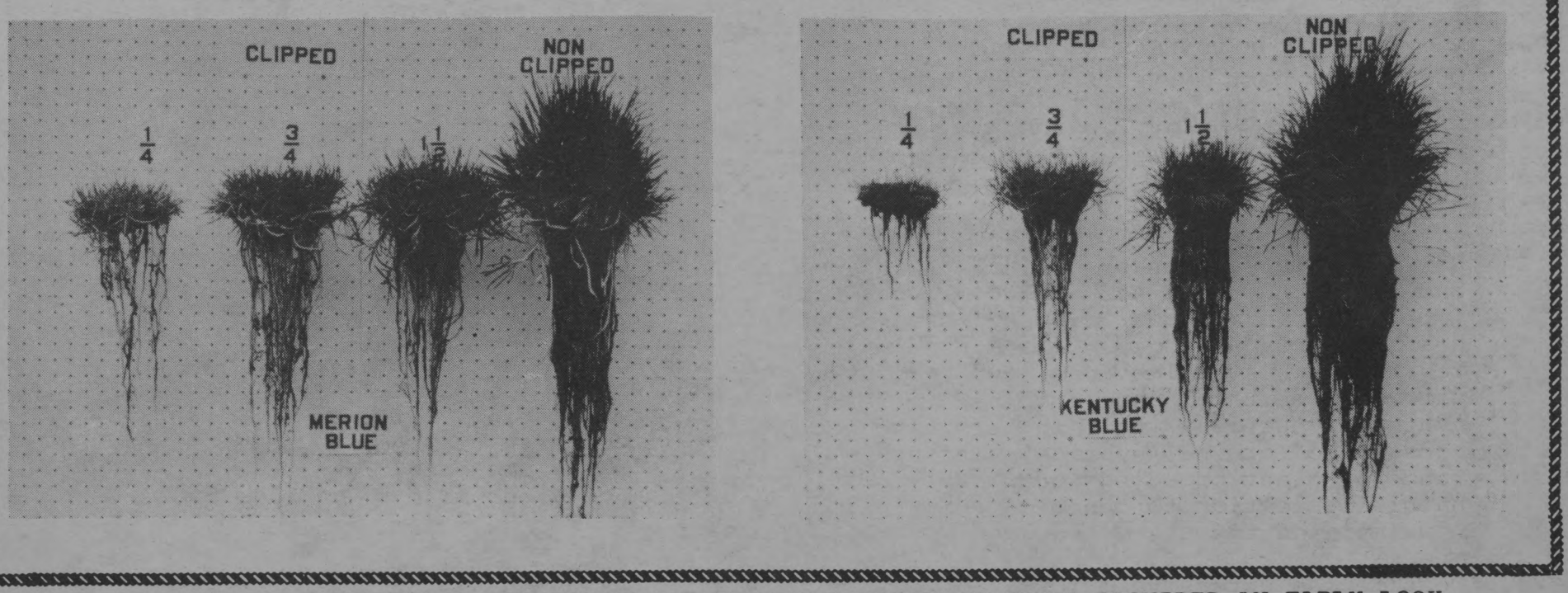
Bentgrasses

Emerald and Prominent creeping bentgrasses

Exeter and Highland colonial bentgrasses

Specialty varieties

Sabre Poa trivialis for moist shade



TURFGRASS RESEARCH CONDUCTED AT THE UNIVERSITY OF MASSACHUSETTS PROVIDED AN EARLY LOOK AT ROOT GROWTH OF BLUEGRASSES CLIPPED AT 1/4, 1/2 and 1 1/2 INCHES IN COMPARISON WITH THOSE NOT CLIPPED. LOWER CLIPPING DEFINITELY RESTRICTS ROOT DEVELOPMENT. OF EVEN GREATER IMPORTANCE, A COMPARISON OF MERION, ONE OF THE FIRST NEW IMPROVED BLUEGRASSES, WITH NATURAL KENTUCKY BLUEGRASS INDICATED IMPROVED ROOT AND RHIZOME DEVELOPMENT AT ALL CLIPPING LEVELS. THIS SUPERIOR ROOTING AND RHIZOME CHARACTERISTIC MAKES MERION BLUEGRASS A KEY COMPONENT OF MANY OF THE BEST SEED MIXTURES USED IN SOD PRODUCTION. NEW BLUEGRASSES THAT HAVE FOLLOWED MERION HAVE MEASURED UP TO THIS IMPROVED ROOTING STANDARD.

(PRESENTATIONS BASED ON KEYNOTE ADDRESSES AND ASSOCIATION AND SOCIETY SPONSORED CONFERENCES.)

GCSAA Conference Speakers Update Turfgrass Research

The Golf Course Superintendents Association of America education programs held at their International Turfgrass Conference and Show bring together each year the country's top research scientists. This years fifty fourth meeting in Atlanta, Georgia featured a wide variety of topics, three of which are reviewed here.

Update on Turf Breeding for Home Lawns

Dr C Reed Funk, Jr
Rutgers University, New Brunswick, NJ

Dr Funk noted that new grasses for home lawns come from field selections (such as Merion bluegrass) or from mutations (induced changes in the genetic make-up of the grass) or from hybridization (crosses made between plants to produce a different genetic make-up). All three methods have been important. Over seventy million pounds of Merion bluegrass has been used world wide. Ecotype selections, such as Seaside bentgrass, Astoria and Highland bentgrasses and Kentucky 31 fescue are all well recognized.

Synthetic varieties that are developed from clones which are crossed, and the progeny tested and evaluated before further selections are made have much to offer. The selection, crossing, evaluation process may be repeated several times before the final selection is made for production of breeder, foundation and certified seed.

Thirty five million acres of pasture in the upper south are planted with tall fescue. From this area of widely different environmental conditions, varying plant types have been selected. From these have been developed the new turf type tall fescues - Brookston, Falcon, Galway, Houndog, Jaguar, Mustang, Olympic and Rebel among others. Compared with the original tall fescues, these have a lower growth habit, produce a denser sod, are more wear tolerant, and are noted for heat,drought and shade tolerance. They are darker green and have been selected for improved disease resistance, particularly Helminthosporium. More Brown Patch disease resistance is needed. Falcon and Rebel are among the best.

What does the future hold in store for new home lawngrasses ? Dr Funk listed the following six growth characteristics of turfgrasses, which have significant potential for improvement.

- Reduced Mowing Requirement

Slower growing grasses and types with a less upright growth habit will require less frequent mowing. In addition, types that are responsive to chemical growth retardants will require mowing less often.

- Improved Tolerance to Drought

Poor soil conditions contribute to the creation of drought stress. Lawngrasses with low maintenance requirements will be better suited for use on poor soils. The hard fescues, such as Biljart, Cristal, Scaldis, Tournament and Waldina, provide a step in the right direction.

- Improved Salt Tolerance

Some soils are naturally high in salts; others become polluted from use of pavement deicers during winter months. Fults Puccinellia distans and Adalaydgrass Paspalum vaginatum are both recent developments that show great promise.

- Improved Disease Resistance

Leaf spot, stripe smut and stem rust are among the turf diseases for which increased resistance is sought. Advances in this area are slow to come by.

GCSAA Conference Speakers CONTINUED

- Improved Turf Quality

National, regional and state tests are used to evaluate turfgrass quality under differing environmental conditions. Plots at eleven locations with evaluations made throughout a five year period are part of a new strategy for improving turf quality.

- Improved Insect Resistance

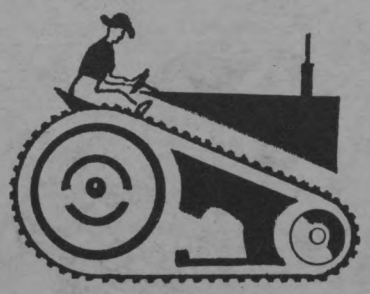
Endophytic fungi live in the tissue of ryegrasses and tall fescues. They are capable of producing compounds that are either toxic or distasteful to some insects. This results in a type of insect resistance.

Summer syndrome in tall fescue is also the result of endophytic fungi. In this instance, animals that graze on the fescue are affected. Current research indicates that stem weevils, sod webworms, billbugs and black beetles are affected by endophytic fungi. Within the new perennial ryegrasses, Pennant has resistance to the sod webworm and Pennant and Regal are most resistant to the billbug.

Old pastures and turf, the world over, are highly infected with endophytic fungi. These can be transmitted by seed; however, old seed (second year hold over) loses endophytic viability rapidly. Turfgrass breeders are challenged to develop grasses with varying amounts of endophytes present so that insect resistance can be predicted. It may well be that lawn seed labels will be required to show endophyte content if and when these developments are fully worked out. In the meantime, endophytic fungi are helping to increase insect resistance in some lawngrasses.

On May 3-4 a Forage and Turfgrass Endophyte Workshop is scheduled to be held in Corvallis Oregon. The objective will be to discuss the current state of research and extension education programs. Particular attention will be devoted to the role of the seed production and technology in dealing with both the desirable and undesirable aspects of endophytes. Dr Funk will participate in this workshop. Additional information on the program and its outcome may be obtained from:

Dr Harold Youngberg
Extension Agronomist
Oregon State University
Corvallis OR 97331 (Phone:503/754-2771)



Breeding For Water Conservation and Low Maintenance Cultivars

Dr James B Beard
Texas A & M University, College Station,TX

Dr Beard pointed out that water is not a renewable natural resource. Ninety nine percent of the earth's water is tied up and only one percent is available. Also, basically the same grasses used one hundred years ago are used now as far as water use is concerned.

An understanding of water use by turfgrasses requires a knowledge of evapotranspiration, rooting, drought resistance, salt tolerance, and technology related to water harvesting systems and use of effluent water. Water use rates and drought tolerance are quite different measurements, and much more work is needed to establish differences, particularly at the variety level. For example, current studies indicate that both tall fescue and St Augustinegrass have high water use rates. Tall fescue is usually considered more drought tolerant. In general, differences are noted between C-3 cool season grasses and C-4 warm season grasses.

Research objectives include a search for ways and means of bringing about reductions in expected water use within the range thirty to forty percent. Reductions of fifty to seventy percent may be possible.

Water Efficient and Drought Tolerant Grasses

Dr Kent W Kurtz
California State Polytechnical Univeristy, Pomona, CA

Dr Kurtz reported on major research in southern California concerned with increasing water efficiency and drought tolerance of turfgrasses. The word is loud and clear:

- demand for water is increasing;
- supply of water is decreasing;
- quality of water is decreasing;
- use less water.

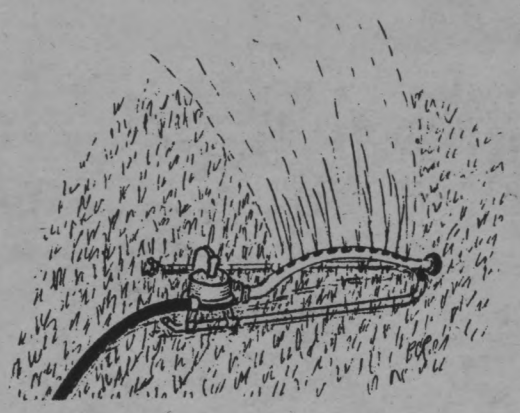
How can gardeners and turf managers cope with this restriction ? The following points were elaborated on:

- use of the right grasses;
- adapt turf to dryer conditions;
- irrigate more efficiently.

Some grasses avoid drought. They are either physiologically tolerant or efficient water absorbers or have deep root systems or leaf structure may be adapted to resist transpiration through placement of stomates or by curling under moisture stress. In general, warm season grasses have deeper root systems. This is an advantage for bermudagrasses. Tall fescues also have extensive root systems and this growth characteristic is beneficial to them. Zoysias and Adalaydgrass have lower evapotranspiration rates. In general, bentgrasses, bluegrasses, fine leaved fescues and ryegrasses have more shallow roots. In terms of cool season grass tolerance to drought, tall fescues rate high, bluegrasses intermediate and bentgrasses low.

GCSAA Conference Speakers CONTINUED

Determinations of irrigation frequency are dependent on root depth, amount of thatch, soil texture and moisture holding capacity. Current research is underway to determine the lowest level of irrigation needed to maintain acceptable turf. This is a matter of learning to manage lawns and turf for drought resistance. It is not only irrigation control, but also involves mowing height and frequency adjustments, preparation for drought by allowing plants to harden off by appropriate restrictions in use of nitrogen and regulation of vertical mowing, aerification and topdressing. Iron can become an important substitute for some nitrogen in helping to maintain color without creating to an over succulence of the grasses.



P.O.BOX 108

(COMMENTARY FROM THE MAIL)

Harvests New Look Scores Points

From: Bill Knoop
Texas Agricultural Extension Service
Dallas, Texas

.... Just received my first issue of Harvests and think it is just great. I really like your technical topics section. We've needed that for a long time. At one point many years ago, USGA Green Section and GCSAA were going to "get together" to develop such a publication, but it never happened.

.... I would like to use some of your material in my newsletter if it's OK. I'll give credit to The Lawn Institute.

From: Joe Howland
Department of Plant, Soil & Water Sci
University of Nevada
Reno, Nevada

.... My compliments on the first issue I have seen of The Lawn Institute Harvests. Good job. I especially like the Threshing of the Journals section. Good to have it all in one spot for us.

From: Jim Carnes
International Seeds
Halsey, Oregon

.... I wish to compliment you on the recent document "The Lawn Institute Harvests", Volume 29 No 4 dated January 1983. This format is really well put together and I feel that it will enhance the future of the Institute, it's purpose and goals.

From: Robert Newman
Department of Horticulture
University of Wisconsin
Madison, Wisconsin

.... I offer congratulations on Harvests. I like it and think the tabloid is the way to go. The quality of articles is a heck of a lot more important than the cost of the paper they are printed on.

From: Carl Whitcomb
Department of Horticulture
Oklahoma State University
Stillwater, Oklahoma

.... just finished reading my first copy of The Lawn Institute Harvests (Vol 29, No 4, January 1983) and thank you very much for adding me to the mailing list. Although my current work relates to turf only indirectly, I am still very much interested in turf. I see turf as one of the major parts of any landscape as it conflicts with or complements all landscape efforts. I remember vividly the 1969 issue of Life magazine in which a Harris poll pointed out that the highest priority item listed by a host of people surveyed was to have "green grass and trees around me". I'm now working mostly on the trees instead of the grass, but the two are inseparable in the eyes of nearly everyone and these two prime landscape elements should be considered more in combination rather than separately.

I don't know the source of funding or support for that Harris poll, but it should be conducted again now that nearly 15 years have passed. I suspect that "green grass and trees" would rate even higher than before.

From: Ken Payne
Department of Crop and Soil Science
Michigan State University
East Lansing, Michigan

.... am writing to congratulate you on your good judgement. First, for not trying to make (Harvests) a fancy, expensive National Georgraphic type and second, for the excellent broad coverage you have given. The capsules of the American Society of Agronomy talks are great for one who didn't get there - and your range of information for many users of turf is marvelous.

Readers' Forum

(NEWS AND VIEWS)

TURFGRASS RESEARCH PROJECT PROPOSALS

Turfgrass scientists are in a unique position to keep us informed of most critical needs for new information. They have the expertise to see the whole while concentrating on various specific projects that contribute to a better understanding of turfgrass growth and development.

Four states, Pennsylvania, Illinois, Oklahoma and Washington, are among the leaders nationally in supporting turfgrass research that exemplifies a creative balance between meeting local and regional needs and the development of perspectives that have wide application.

The following five project descriptions are presented here in abbreviated form to provide an opportunity for you, first of all, to be informed of new research proposals, and secondly, to be in touch with turfgrass scientists who are working in areas worthy of grant-in-aid support.

Pennsylvania State University
University Park, PA 16802

Dr Thomas L Watschke
Department of Agronomy

NEW RESEARCH ON EFFECTS OF LANDSCAPE MANAGEMENT ON THE QUALITY OF RUNOFF WATER IN URBAN-SUBURBAN AREAS.

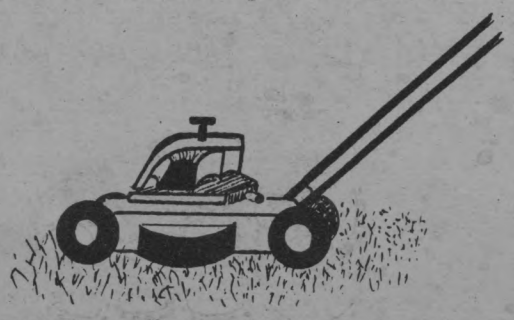
In the March/April 1982 edition of the American Lawn Applicator, Dr Robert W Schery, then the Director of The Lawn Institute, published an article entitled "Managing Urban Habitat". In his article, he asked the question, "Why aren't the benefits of lawns and ornamental plantings in the urban environment emphasized to the public sector ?" Instead, most media attention is focused on the alleged degradation of water quality as a result of fertilizer nutrients and pesticides applied to the landscape.

All receiving bodies of water have water quality standards specified for them based on natural quality plus the use for which it is intended (drinking, recreation, or propagation of aquatic life).

Water quality of several stormwater systems has been assessed over the past 15 years in different parts of the United States. It has been concluded that a significant pollution potential exists for untreated stormwater. The sources of pollutants have been categorized as occurring from three sources: 1)land surfaces, 2) catch basins, and 3) combined sanitary and storm sewer systems. Of the three, the land surface has been identified as the primary source of pollutants, particularly the streets, gutter, and other impervious areas connected to the streets or storm sewers. A long list of potential pollutants can accumulate on these surfaces (including movement of materials from landscaped surfaces).

It has been estimated that when population changes from 100 to 13,000 persons per square mile, the peak rate of surface runoff for a given surface area becomes about 10 time greater. Concurrently, the time elapsed before runoff occurs decreases to about one tenth that for rural areas. It is projected by the year 2000 that 80 % of the population will reside on less than 10 % of the land.

At The Pennsylvania State University, the College of Agriculture has initiated the development of a research area to study the effects of landscape management on the quality of runoff water. This area represents an expansion of the existing Valentine Turfgrass Research Center. In addition to water quality studies, future research at the expansion site will relate to turfgrass problems in the home lawn, sod, landscape, and athletic field areas. As an inter-disciplinary project, it is being supported by the departments of Agronomy, Entomology, Plant Pathology, Agricultural Engineering and Horticulture. At present, an inactive soil runoff testing facility is being renovated to accommodate this new research project. Additional funding to develop the facility has been granted to the University by the Pennsylvania Turfgrass Council. Installation of different landscape schemes and imposition of management treatments are scheduled for the summer of 1983. Landscapes of varied composition and density will be fertilized and receive pest control consistent with current recommendations and practices.



Another question raise by Dr Schery in his article early last year was "Why shouldn't lawns and ornamental plantings be a required part of community planning ?" Why shouldn't they, indeed ! We are hopeful that our research will clearly document the degree to which landscape management inputs affect the quality of runoff water from such sites. Thus, one of the goals of this study will be to define management practices that improve the quality of life for urban-suburban society without deleterious effects on water supplies. Another goal is to determine the role of landscaped surfaces in maintaining the quality of runoff in urban-suburban watersheds. As a result of research of this type, it may become a standardized recommendation of community planning commissions that specific amounts of land intended for development must be designated as pervious landscaped areas.

University of Illinois
Urbana, IL 61801

Dr Thomas W Fermanian
Department of Horticulture

NEW RESEARCH ON THE DEVELOPMENT OF A COMPUTER CONSULTING SYSTEM FOR TURFGRASS ESTABLISHMENT AND MAINTENANCE - "TURFGRASS ADVISER".

This proposal presents a plan to develop "TURFGRASS ADVISER", an expert system for providing advice to professional turfgrass managers, county extension advisers, educators, and homeowners on the establishment and maintenance of turfgrasses. The system will be based on the general purpose expert system "ADVISE" developed at the University of Illinois Department of Computer Science. An expert system is a computer program that contains formally encoded knowledge of experts in a given discipline and is able to help non-experts to solve problems in the discipline. After the system is successfully developed on a large mainframe computer, it will be modified for use on an inexpensive transportable microcumputer so it can be readily available to anyone needing advice on establishing turf. Several potential benefits of this system are an annual savings of an estimated 3-4 million dollars in Illinois spent on reestablishing turf areas where improper materials or inappropriate establishment techniques were used and the development of an important new educational tool. "TURFGRASS ADVISER" could be used at universities, junior colleges, vocational schools, and offices of the Cooperative Extension Service to provide students or turf managers with an insight into the decision-making process in formulating a plan for turf establishment or the selection and timing of important maintenance practices.

University of Illinois
Urbana, IL 61801

Dr David J Wehner
Department of Horticulture

NEW RESEARCH ON THE IDENTIFICATION OF TURFGRASS CULTIVARS THROUGH USE OF HIGH PRESSURE LIQUID CHROMATOGRAPHY.

Turfgrass breeders release many new cultivars each year. At the University of Illinois, there are 84 Kentucky bluegrasses, 47 perennial ryegrasses, and 25 tall fescues in test plots. This does not represent the total number of cultivars available for testing, but rather, a sampling of the major cultivars of each species. Identification or recognition of these cultivars might be possible when they are planted in small plots where the entries are present for side by side comparison. In most other situations, identification is essentially impossible.

Genetic differences between turfgrass cultivars are manifest by differences in their protein content. Research results have been published on the use of polyacrylamide gel electrophoresis to separate and identify turfgrass cultivars by examining their protein content. In this technique, proteins extracted from the turfgrass plants are separated according to their size and charge as they migrate through the pores of a polyacrylamide gel. This gel is suspended in a buffer solution which conducts current from nearby electrodes. The current sets up an electric field which results in the separation of the proteins by charge as well as by size.

High pressure liquid chromatography has been used to separate protein mixtures as well as identify cultivars of other species of plants using other types of compounds.

In the case of HPLC, the proteins are separated in a column, the separation being based on the size of the protein. Once the proteins have been separated, they pass through a spectrophotometer that is connected to the HPLC. The spectrophotometer quantifies the output from the column and feeds a signal into an electronic integrator/recorder. The integrator can quantify the amount of protein coming off the column, compare one peak to another, or compare the output with that generated from a standard protein mixture.

The proposed study will concentrate on answering two questions. First, is the HPLC technique more efficacious than polyacrylamide gel electrophoresis for turfgrass cultivar identification? For this part of the research, several of the cultivars separated in an earlier study will be used. The second part of the project will involve trying to identify cultivars of tall fescue and perennial ryegrass.

Oklahoma State University
Stillwater, OK 74078

Dr A Douglas Brede
Department of Horticulture

NEW RESEARCH ON EVALUATION OF TALL FESCUES, STUDY OF CULTURAL FACTORS TO CURB BERMUDAGRASS ENCROACHMENT AND STUDY OF DIFFERENCES IN SEEDLING VIGOR AND REQUIRED SEEDING RATES UNDER OKLAHOMA CONDITIONS.

Until recently, the unchallenged dominant lawn species in Oklahoma was bermudagrass. Unfortunately, bermudagrass suffers from several problems in this state, including winter injury, spring dead spot, and the tendency to become a serious weed problem in shrubbery and flower beds. Bermudagrass also does not perform adequately in shady locations. Tall fescue, a shade-tolerant, winter-resistant bunch grass holds potential to overcome the negatives of bermudagrass.

New research is planned as follows:
To screen the current and experimental cultivars to tall fescue for adaptation to Oklahoma conditions; to evaluate five popular tall fescue cultivars at a variety of sites throughout the state to determine their range of adaptation; to establish regional demonstration plots to help "sell" tall fescue to the Oklahoma consumer.

The greatest limiting factor to the successful usage of tall fescue turf in Oklahoma is the invasion by bermudagrass. Bermudagrass is naturally abundant throughout Oklahoma and can become a ferocious weed in lawns of cool-season species. Because of its strongly stoloniferous habit, bermudagrass does not mix well with other grasses, and a patchy appearance results. Herbicidal control of bermudagrass in tall fescue has met with limited success.

New research is planned as follows:
To determine whether cultural control can be used to effectively limit the encroachment of bermudagrass into tall fescue turf; to determine whether certain cultivars of tall fescue are better able to restrict bermudagrass invasion; to evaluate the effects of tall fescue seeding rate, maintenance N fertilization, and bermudagrass vector on encroachment.

In addition, new research is planned to determine which turfgrass cultivars possess the greatest seedling vigor; to determine which cultivars possess the greatest number of field-viable seeds per unit weight.

Washington State University
Western Washington Research and Extension Center
Puyallup, WA 98317

Dr Roy L Goss
Department of Agronomy

NEW RESEARCH ON ETIOLOGY AND CONTROL OF A TAKE-ALL PATCH-LIKE DISEASE OF BLUEGRASS TURF.

Kentucky bluegrass is commonly utilized as a turfgrass throughout eastern Washington and to a lesser extent in western Washington. Since the mid 1970's, a disease which resembles take-all patch (Ophiobolus patch) has caused considerable damage to recently sodded bluegrass turf in the Tri Cities area of eastern Washington. Recent observations indicate that this problem is present on bluegrass turf throughout eastern Washington and it has recently been observed on bluegrass turf in the Puget Sound area of western Washington.

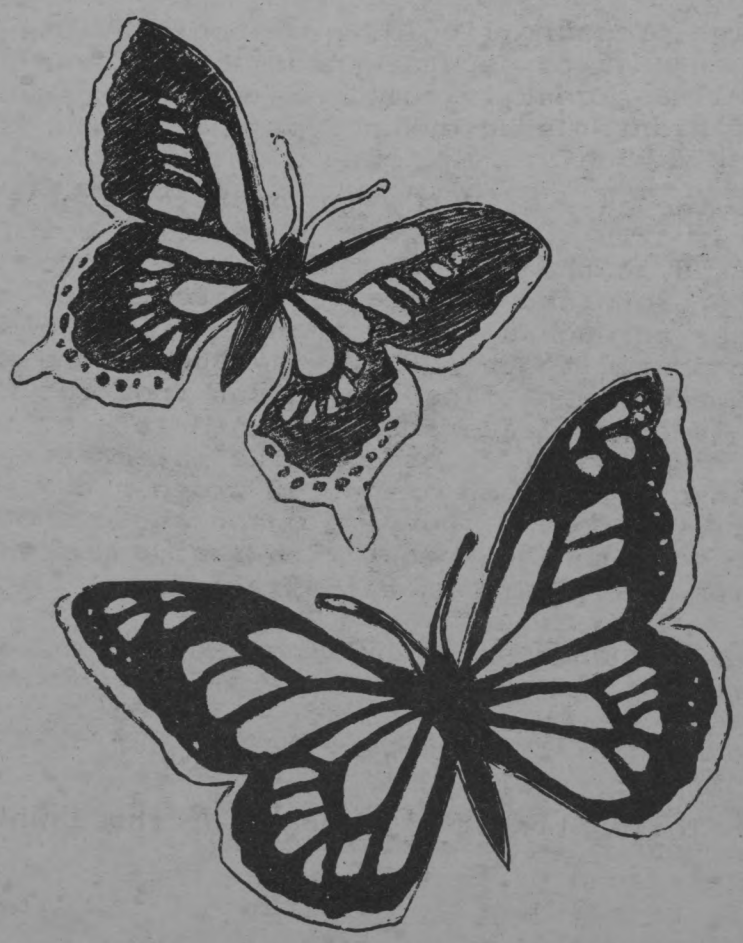
Most of the affected turf was established as sod and initial symptoms generally appeared one to three years after establishment. Symptoms appear in late spring or early summer as chlorotic spots or patches with a thinning and/or dying of the grass in rings or patches. Infected plants are easily lifted from the soil and both the roots and shoots of these plants eventually die. Doughnut shaped rings or patches from several inches to one to two feet in diameter are formed as symptoms develop and active rings have margins which are a light reddish-brown in color. The centers of rings are usually invaded by weeds, annual bluegrass and fescues.

Runner hyphae and plate mycelium resembling those produced by the fungus which causes take-all patch on bentgrass, Gaeumannomyces graminis var. avenae, are commonly found on the roots and crowns of diseased plants. Positive identification of this fungus has not been possible because we have not been able to obtain fruiting structures (perithecia). A Gaeumannomyces- like fungus has been isolated from diseased plants and limited pathogenicity studies indicate that it is pathogenic on 'Baron' bluegrass, a common component of sod affected with this disease. Efforts to control this disease by professional lawn maintenance companies have been unsuccessful.

New research is planned as follows: to determine the distribution of this disease on bluegrass turf; to determine the relationship of management practices to disease development; to characterize and identify soil types and previous cropping history; to characterize and identify the Gaeumannomyces-like fungus associated with diseased plants; to compare the pathogenicity of the Gaeumannomyces-like fungus from bluegrass to known isolates of G. graminis var. avenae on bluegrass, bentgrass and oats; to determine the susceptibility of bluegrass cultivars to this Gaeumannomyces-like fungus; to determine if establishment method (sod vs seed) influences disease development; to evaluate the effectiveness of modifying management practices (including irrigation, fertility practices, soil pH), fungicide applications and biological agents in controlling this disease.

'To accomplish great things we must not only act, but also dream; not only plan, but also believe.'

— ANATOLE FRANCE



QUARTERLY PROGRAM REPORT

(INSTITUTE PROGRESS AND ACHIEVEMENT)

Harvests

In addition to travel and participation in conferences and meetings listed under "Itinerary", program activity has involved the following six areas -

EXECUTIVE COMMITTEE MEETING

The Lawn Institute Executive Committee met in Chicago on March 23. Plans for the Annual meetings on June 28 were reviewed and a first draft Agenda prepared.

Membership matters were discussed. Fifty firms were listed as members for 1982-1983. Ways and means for attracting new Proprietary, Sponsoring and Supporting members were reviewed.

Variety Review Board activity was discussed. Some modification in the list of forty nine entries will be proposed for 1983-1984.

Use of The Lawn Institute Logo and Seal of Approval helps to increase visibility of the organization. This use also requires monitoring for quality control so that a high degree of credibility is maintained. Thus, care will be exercised in the development of additional uses of the Logo and Seal.

Lawn Institute releases for Lawns, Gardens, and Pools and Harvests and Press Kits were reviewed and proposals for the future prioritized.

Limited availability of funds for research and sponsorship of special projects by The Lawn Institute was recognized as a deterrent to activity in this area. The Lawn Institute will work with organizations such as The Musser International Turfgrass Foundation who have well organized approaches to funding turfgrass research throughout the world.

LATE SPRING - EARLY SUMMER PRESS KIT

Modification of mailing lists and changes in Press Kit format were responsible for a rescheduling of release from early spring to late spring/early summer. A mailing list of 1670 names and addresses in the cool humid region of the country is now in use.

The Kits will include 19 sheets (34 printed sides) and feature -

-Toile Strebor- "I speak for the lawn"

- A Twelve Point Check List for a More Beautiful Lawn
- LISTS - Lawn Institute Special Topics Sheets
- Reprint- "The Politics of Landscape Horticulture "
- Short articles on lawn care

I SPEAK FOR THE LAWN

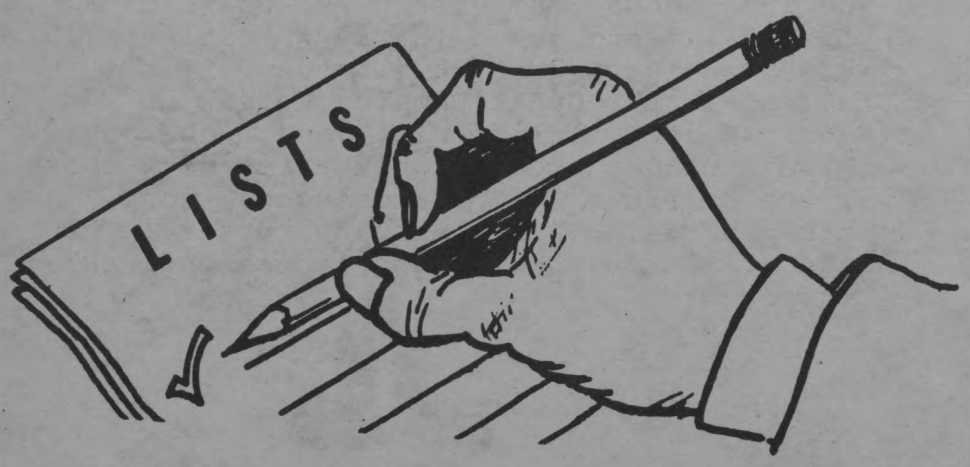
Healthy, vigorous lawngrass plants have come to life in the form of Toile Strebor, who will speak for the lawn. With release in the late spring/early summer Press Kits, his first comments are: "After years of toiling day and night, week in and week out to produce a nice lawn for you, it's time for us lawngrasses to stand up and be counted. Say it like it is, be assertive, you say. Well, why not ? Here's how to make things easier for us turfgrasses to make your lawn the talk of the neighborhood this summer". He will go on to describe what it's like being a lawngrass plant and give several tips on how he'd like to be treated this summer.

Future Press Kits will include comments from Toile Strebor and other components of the landscape. A new look at landscape ecology will be presented through these characters. Garden writers and editors are invited to utilize this educational concept. Change the names if they desire, but present a flavor of what it's like being a component of the lawn environment.

LAWN INSTITUTE SPECIAL TOPICS SHEETS

Sixteen LISTS (Lawn Institute Special Topics Sheets) have been prepared as an aid in providing information to help answer specific questions about The Lawn Institute and as a source of technical information on growth characteristics of lawngrass cultivars. Copies of the following LISTS are available upon request.

- An Introduction to: The Lawn Institute
- The Lawn Institute Officers, Executive Committee and Board of Directors - 1982-1983
- Membership in The Lawn Institute
- Servicing Needs for Information on Lawns
- Landscape Ecology Topics
- Variety Review Board Cultivar Listings 1982-1983
- Lawn Institute Recognized Bluegrasses
- Lawn Institute Recognized Fine Fescues
- Lawn Institute Recognized Turf Type Perennial Ryegrasses
- Lawn Institute Recognized Turf Type Tall Fescues
- Lawn Institute Recognized Bentgrasses
- A Twelve Point Check List for a More Beautiful Lawn
- A Selected List of Key Contacts - Landscape and Turfgrass
- A Selected List of Key Publications - Landscape and Turfgrass
- Turfgrass Science References
- Reference List on Thatch and Its Control



LANDSCAPE ECOLOGY REPRINTS AVAILABLE

Reprints of fourteen articles authored by Dr Robert W Schery, former Director of The Lawn Institute, have been included in a packet that features information on Landscape Ecology. The following topics are included:

- Lawns Across America
- Lawns: A Concept Proven
- Lawns Come Into Their Own
- What is the Grass ?
- The Migration of a Plant
- Science and the Lawn
- A Man-made Ecosystem - Your Lawn
- Lawn Ecology
- Recarpeting Urban America
- Managing Urban Habitat
- Turfgrass, The Times and Some Trends
- No Frills Future May Require Closer Attention to Turf Selection
- In Praise of Unpampered Turf
- Where You Can't Have a Lawn

We'd be glad to send a set of these reprints upon receipt of your request.

ARTICLES PUBLISHED

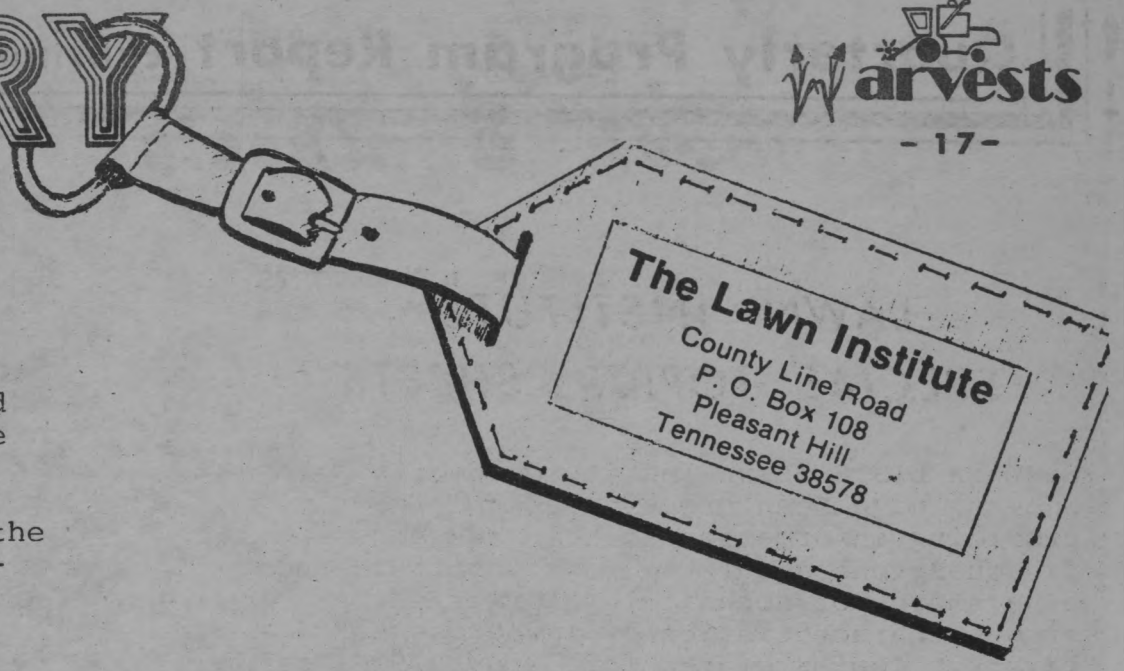
During the second quarter 1983 two articles were released as follows:

- "The Politics of Landscape Horticulture" was published as part of a series entitled Growing The Market in the March 1983 issue Lawn and Garden Marketing Vol 22 No 3. This was adapted from material presented in Harvests Vol 29 No 3
- "Overseeding: A Practice That Has Come of Age" was published in the March 1983 issue of Lawn Care Professional Vol 2 No 2. This was presented by the editors from information provided by The Lawn Institute.

If we fail to get our latest Press Kit to you, just drop us a line and we'll update this mailing list to include your name and address.

ITINERARY

(TRAVEL, MEETINGS ATTENDED)



In a continuing attempt to keep The Lawn Institute current in turfgrass science and practice, the following contacts were made during the first quarter of 1983.

January 6,7 — The Annual Conference of the Tennessee Turfgrass Association, Nashville, TN

Paper presented:
"Grasses That Fit the Climate"

February 20-24 — Golf Course Superintendents Association of America International Turfgrass Conference and Show, Atlanta, Georgia

February 24 — Musser International Turfgrass Foundation Annual Board Meeting, Atlanta GA

February 28-March 2 — Midwest Regional Turfgrass Conference, Purdue University, Lafayette, IN

Papers presented:
" Turfgrass Germplasm Explosion"
"Lawngrass Seed- A Cultivar Clinic"
"Starting Grass Seedlings"

March 4 — Meeting with research and education specialists at Chemlawn, Columbus, OH

March 23 — The Lawn Institute Executive Committee Meeting, Chicago, IL

Looking Ahead

(PLANS FOR THE FUTURE)

The Lawn Institute's Director will be meeting with the following during the second quarter of 1983:

April 21 — Meeting with research and education specialists at O M Scotts, Marysville, OH

May 4 - 6 — 1983 Arizona Turf and Landscape Conference, Tucson, Arizona

June 26-30 — American Seed Trade Association 100th Annual Convention, San Francisco, California.

June 28 — The Lawn Institute Membership and Board of Directors meetings, San Francisco, California

LAWN INSTITUTE 1983 ANNUAL MEMBERSHIP AND

BOARD OF DIRECTORS MEETINGS

The 1983 Annual Membership and Board of Directors meetings of The Lawn Institute will be held on June 28 (Tuesday) from 1 to 3 pm at the Hyatt Regency Hotel in San Francisco, California. As in the past, these meetings are in conjunction with those of the American Seed Trade Association. This year is ASTA's 100th anniversary. The Lawn Institute is starting its second quarter century .

Research Synthesis

(ANALYSIS OF RESEARCH REPORTS
AND INTERPRETATION OF RESULTS)

The Lawn Institute receives requests regularly for data that describes the nature and extent of the turf and lawngrass commodity throughout the country. Information is desired in many of the categories discussed by Drs Daniel and Freeborg in their Turf Managers Handbook. Fourteen categories with forty eight subdivisions are listed as follows:

I. Intense care -
- golf course greens, tees, fairways and roughs
- grass tennis courts
- lawnbowling grounds
- croquet courts

II. Limited care -
- roadsides
- airport grounds
- military grounds
- race track grounds
- rights of way- railroads and utilities

III. Intense wear -
- athletic turf

IV. Medium wear -
- parks
- school and playgrounds
- camp sites
- polo fields

V. Limited wear -
- industrial lawns
- institutional grounds
- government grounds
- college and university grounds
- church and cemetery grounds

VI. Small landscaped areas -
- home lawns
- condominium and apartment grounds
- motel and resort grounds
- shopping center landscapes

VII. Production -
- seed
- sod
- vegetative propagules

VIII. Custom care service -
- lawn service

IX. Supply Industries -
- seed
- fertilizers
- equipment
- irrigation systems
- pesticides
- soil modifiers and conditioners

X. Merchandizing units -
- wholesale
- regional distributor
- retail

XI. Professional organizations -
- technical
- trade

XII. Publishers -
- books
- journals
- magazines
- newsletters

XIII. Research centers -
- public - Land Grant colleges and universities
- private - industrial

How Green Is Green ?

Continued

XIV. Education centers -
- graduate programs
- baccalaureate
- less than baccalaureate
- short courses
- conferences

There are obvious difficulties in keeping up-to-date in each of these categories and subdivisions. Data is available; however, the exact interpretation may not always be clear. Through Lawn Institute Harvests we will attempt to bring together facts and figures from time to time that will help in understanding just how green is the green of the turf and lawngrass commodity in its various component parts.

Numbers of Turfgrass Cultivars

Surveys of turfgrass research and evaluation plots around the country indicate that over three hundred numbered and named cool season turfgrasses are being compared under varying environmental and growth conditions. Well over one hundred of these are on the market. Over seventy five are registered by the USDA Plant Variety Protection Office and The Lawn Institute Variety Review Board recognizes about 50 of the best proprietaries. Thus, there is a wide selection of cool season grasses to provide a high quality green hue to the lawnscape.

Home Lawn Data.

Most estimates of lawngrass in the United States place the acreage at close to 5,000,000 or about 7,800 square miles or about 8 times the size of the state of Rhode Island. Such an estimate assumes a reasonable base level of maintenance. It would include lawns from 45,000,000 single family dwelling units that are owner occupied as well as some rental property. This would make the size of the average lawn about 4,000 square feet.

Lawn Care Surveys

Dr David Martin, Director of Research for Chemlawn Corporation in Columbus, Ohio presented survey data on "Grass and The Lawn Care Industry" at the 1983 Midwest Regional Turf Conference at Purdue University. The following notations demonstrate clearly the importance of home lawns in the United States and the potential for high quality lawn service.

Dr Martin reported a gross income of 1.5 billion dollars for the lawn care industry in 1981. This figure represents the total of $870,700,000 gross income for 7,600 chemical application businesses with 6,700,000 accounts and $627,000,000 gross income for 7,300 mowing maintenance businesses with 424,200 accounts.

NUMBERS OF COOL SEASON TURFGRASS VARIETIES AND CULTIVARS IN THE UNITED STATES

Turfgrasses	Under Evaluation	Marketed	USDA Protected*	Institute Recognized#
Bluegrasses	100	40	24	19
Fine fescues	50	25	15	7
Perennial ryegrasses	50	32	28	13
Turf type tall fescues	20	11	8	5
Bentgrasses	50	11	1	4
Other special purpose grasses	40	8	1	1
Total	310	127	77	49

* USDA Plant Variety Protection
\# The Lawn Institute Variety Review Board

How Green Is Green ?

Continued

A survey of the 45 million owner occupied single family homes with lawns indicated that about fifty percent do little but mow. Forty four percent are do-it-yourself gardeners and six percent contract for professional lawn care. Of these homes, there are about 20,000,000 with a family income over $20,000 a year. A survey of this group indicated about thirty percent only mow and perhaps water their lawns. Fifty seven percent were do-it-yourself gardeners and thirteen percent availed themselves of professional lawn care. With from thirty to fifty percent of single family home owners caring for their lawns in a very minimal way, the potential for upgraded lawns would seem great. Both do-it-yourself and professional lawn care proponents increase with family income above $20,000.

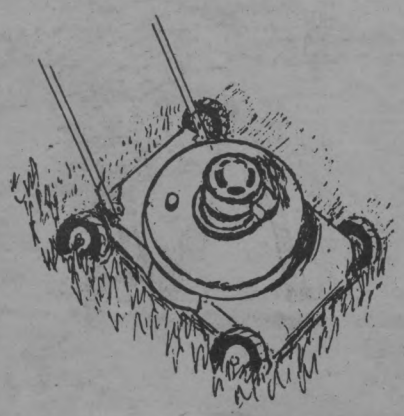
Professional lawn care survey data discussed by Dr Martin included the following ten topics:

- home gardener lawn care attitudes;
- home gardener lawn care emphasis;
- home gardener lawn care concerns;
- lawn sizes under professional lawn care contract;
- lawn care contract service contacts;
- lawn care contract weed control;
- lawn care contract insect control;
- lawn care contract disease control;
- lawn care contract fertilizer and related miscellaneous conditions;
- turf and grounds maintenance fertilizer and pesticide use

Home Gardener Lawn Care Attitudes
(Most important feelings about lawn care)

Surveys indicate that about one third of those questioned enjoy lawn care, while about one fifth are indifferent. The satisfaction of gardening has not adequately been applied to the lawn situation. Educational effort in this area would seem desirable.

Enjoy lawn care	30 %
Indifferent to lawn care	18 %
Contract professional lawn care	16 %
Concern for time/money	10 %
No opinion	9 %
Other miscellaneous concerns total	17 %
TOTAL	100 %



Home Gardener Lawn Care Emphasis
(Most important practices in lawn care)

Home gardener knowledge of fertilizer use has resulted in over one quarter of those surveyed placing this on a high emphasis list. Weed control and insect control are recognized as important practices. But, over half of those questioned apparently did little but mow and perhaps water.

Fertilization	26 %
Fertilization plus weed control	17 %
Weed control	10 %
Insect control	8 %
None of the above(leaves mowing and watering)	52 %

Multiple answers recorded

Home Gardener Lawn Care Concerns
(Most important limitations in lawn care)

Home gardener concern for limitations in the culture of a fine lawn were headed by weeds and particularly crabgrass. Shortages of water are becoming increasingly well recognized as a limiting factor. Mowing and trimming often reveal the effects of other lawn conditions on growth characteristics of the component cultivars. The fact that inadequate time for lawn care, excess traffic, insect damage, poor soil and poor contour are of similar magnitude is indicative of a better understanding of lawn culture than might be expected.

Weeds/crabgrass	36 %
Shortages of water	14 %
Mowing and trimming	13 %
Shortage of time	9 %
Excessive lawn use and traffic	8 %
Insects/ animals damage	8 %
Poor lawn soil	7 %
Poor contour	5 %
TOTAL	100 %

Lawn Size for Contract Care

Of all lawns contracted for professional lawn care, about one third are 5,000 square feet in size or under. Numbers of lawns decreased with increasing size to 30,000 square feet and then increased as lawn size approached one acre or larger. Lawn size is likely to be related to gardening interests of the property owner and to level of income. Some follow-up data on characteristics of these gardeners would be of interest.

Square feet	
5,000	34 %
7,500	20 %
10,000	16 %
20,000	11 %
30,000	4 %
40,000	15 %
TOTAL	100 %

Lawn Care Contract Service Contacts
(Depending on location- most within the cool, humid region)

When professional lawn care service contacts are made, the large majority are concerned with weed infestations. Fertilization and related miscellaneous conditions are of lesser concern but generally run ahead of calls on insects and diseases.

Weeds	51-68 %
Fertilization and related miscellaneous conditions	15-23 %
Insects	9-30 %
Diseases	4- 9 %

Lawn Care Contract Weed Control
(Depending on location - most within the cool, humid region)

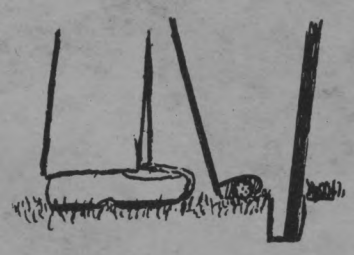
Weed control contacts are most often concerned with summer annual broadleaf weeds. Perennial broadleaf weeds are of next importance. Summer annual grasses are not of much greater significance than perennial grasses. This tends to indicate that crabgrass control measures are being used effectively or that crabgrass is being accepted as a satisfactory ground cover.

Summer annual broadleaf	26-51 %
Winter annual broadleaf	3-5 %
Perennial broadleaf	10-53 %
Summer annual grasses	6-11 %
Oxalis/spurge	6-38 %
Perennial grasses	4- 8 %

Lawn Care Contract Fertilizer and Related Miscellaneous Conditions
(Depending on location- most within the cool, humid region)

Drought is recognized as a major cause of lawn injury. Other than varietal differences, which are not well recognized, other conditions are observed at a similar frequency.

Drought injury	22-47 %
Thatch	5-15 %
Mowing and grooming	5-15 %
Color- mineral difficiencies	5-18 %
Streaks and burns	6-13 %
Animal injury	3-10 %
Varietal differences	1-6 %



Lawn Care Contract Insect Control
(Depending on location - most within the cool, humid region)

A greater recognition of grub damage is evident than for any other lawn insect. In these instances, injury to the grass may well be more significant and thus of greater concern. Wide spread distribution of grubs is undoubtedly a factor.

White grubs	36-93 %
Billbugs	1-35 %
Chinch bugs	4-10 %
Sod webworms	1- 7 %

Lawn Care Contract Disease Control
(Depending on location - most within the cool, humid region)

Of the major lawngrass diseases, Fusarium blight and leaf spot generate the most professional lawn service calls. Greater effort in providing gardeners with lawn disease information would seem of value in identification control or prevention measures.

Fusarium blight	5-40 %
Leaf spot	10-33 %
Snow mold	4-16 %
Brown patch	2-11 %
Red thread	1-21 %
Dollar spot	0-23 %

Turf and Grounds Maintenance
Fertilizer and Pesticide Use

On the basis of fertilizer and pesticide use in the United States, lawn care accounts for about one third of the total. A second one third is devoted to golf course maintenance. All other turf and lawngrass areas account for the remaining one third.

Location	Millions of Dollars	% of Total
Lawns	185	32
Golf Courses	175	30
Landscapes	110	19
Educational	55	9
Parks	27	5
Industrial	14	2
Other	21	3
TOTAL	587	100

How Green Is Green ? Continued

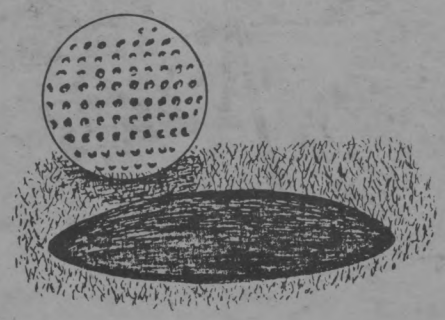
This data characterizes lawn care during the early 1980's in a most vivid way. The Lawn Care Industry has provided a valuable service in the release of this information. It, with other data, make up turfgrass commodity statistics that relate to the economic impact of turf and lawngrasses in various state and regional surveys.

Turf and Lawngrass Value to the Economy

As part of a recent analysis of the value of turf to the Rhode Island economy, Dr D Thomas Duff of the University of Rhode Island noted that the sales of turf related products are not identified in reports on economic statistics. Instead, they are included in categories such as: "General Merchandise", "Lumber, Building Materials, Hardware and Farm Equipment" and "Other Retail Stores". The Census of Agriculture recognizes only the farm value of sod produced as a statistical item. Dr Duff believes that even though the annual dollar expenditures for turf maintenance are scattered through several sales reporting categories, they can be approximated.

Turfgrass surveys conducted over a period of years have been reported from Pennsylvania, Florida, Oklahoma and West Virginia. Methods differ among surveys, but generally, they are based upon results obtained from responses to questionnaires submitted to a cross-section of those involved in maintaining turf. The usual scheme is to identify expenditures on land classified as 1) home lawns; 2) golf courses; 3) schools; 4) colleges and universities; 5) airports; 6) parks; 7) highways; 8) sod farms. These four states represented very different parts of the United States. Diverse societal mixes between agricultural and urban populations were noted.

The value of the turf industry to Rhode Island in 1982 was approximated using data published in these surveys. Several assumptions were made during the process: 1) expenditures for turf maintenance are directly related to population; 2) increases in the cost of turf maintenance since the year of the survey have followed the Consumer Price Index; 3) the mix of expenditures in the several categories is similar in Rhode Island to that in the reporting states. A fourth multiplier was used to recognize the quite different climatic regions from which data were taken. For instance, Florida certainly has a much longer season than Rhode Island and irrigation expenditures there are considerably higher.



Data used to extend the results of the previous surveys to 1982 turf related expenditures in Rhode Island produced an average value over the four independent data bases of 43.5 million dollars. C R Skogley estimated annual turf expenditures in Rhode Island in 1970 were 15.98 million dollars, using a New Jersey survey not a part of these calculations. His value multiplied by a Consumer Price Index increase of 2.7 since 1970 is 43.1 million dollars for 1982, very near the 43.5 million dollar average established from regional data.

Rhode Island has experienced rapid growth in commercial sod production since 1970. This is not included in the calculation, therefore, the estimate is conservative. A harvest of 1,000 acres of sod per year would add about 4.8 million dollars, bringing the total to 48.3 million.

The professional lawn care industry has enjoyed very rapid growth in Rhode Island since 1980. Expenditures for this service are mostly transferred from others. That is, the homeowner is not buying lawn care materials as a direct purchaser but through the particular service contracted. Some additional dollars could be added to the total to include those who had previously made few expenditures; however, Dr Duff had no data base for calculating this amount. To remain conservative, therefore, no adjustment in the total was made for this factor.

This method of estimating the value of the turfgrass commodity under current economic conditions yields reasonable results and may well be applicable to other states and regions.

How Green Is Green ? Continued

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Approximate expenditures for turf maintenance in Rhode Island, 1982. Based upon R.I. population of .93 million.

Survey Year	State	Population Millions	Turf Expenditure Millions	CPI * Multiplier	Seasonal Multiplier	Approximate '82 RI Turf Expenditures Millions
1966	PA	11.5	164.8	2.9	1.0	38.6
1967	WV	1.8	31.8	2.8	1.0	46.0
1976	FL	9.7	538.9	2.2	0.5	56.8
1978	OK	3.0	69.5	1.9	0.8	32.8
Average value						43.5

* Consumer Price Index Multiplier

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Estimated Annual Expenditures for Turf Maintenance by Category in Rhode Island - 1982.

Facility	*1970 Estimate $ Expenditures	** 1982 Estimate $ Expenditures
Airports	40,000	108,000
Athletic Fields	60,000	162,000
Cemeteries	500,000	1,350,000
Golf Courses	2,800,000	7,560,000
Home Lawns	12,000,000	32,400,000
Industrial Lawns	200,000	540,000
Parks	125,000	337,500
Public Properties	25,000	67,500
Roadsides	150,000	405,000
Schools	80,000	216,000
TOTAL	15,980,000	43,146,000

* 1970 estimate by C R Skogley
** Calculated using 2.7 Consumer Price Index inflator 1970-1982.

THE LAWN INSTITUTE

County Line Road
P. O. Box 108
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Dr J Murray
USDA ARS BARC
Bldg 001 Rm 333
Beltsville MD 20705

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Editor: Eliot C Roberts, PhD

Associate Editor: Beverly C Roberts, MA

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