JULY 1984

LAWN INSTITUTE

Harvests

Volume 31 Number 2

THE HARVEST MIX

This Harvest Mix has something for all lawngrass enthusiasts - professional and amateur alike. We actually hope that you find all of it of interest.

-"A Day in the Life of The Lawn Institute" reviews briefly the broad spectrum of lawn concerns that this organization attempts to address. This was presented as the Annual Report to the membership on June 26 in Denver, Colorado.

-Turfgrass research projects at the University of Tennessee and at Mississippi State University are outlined.

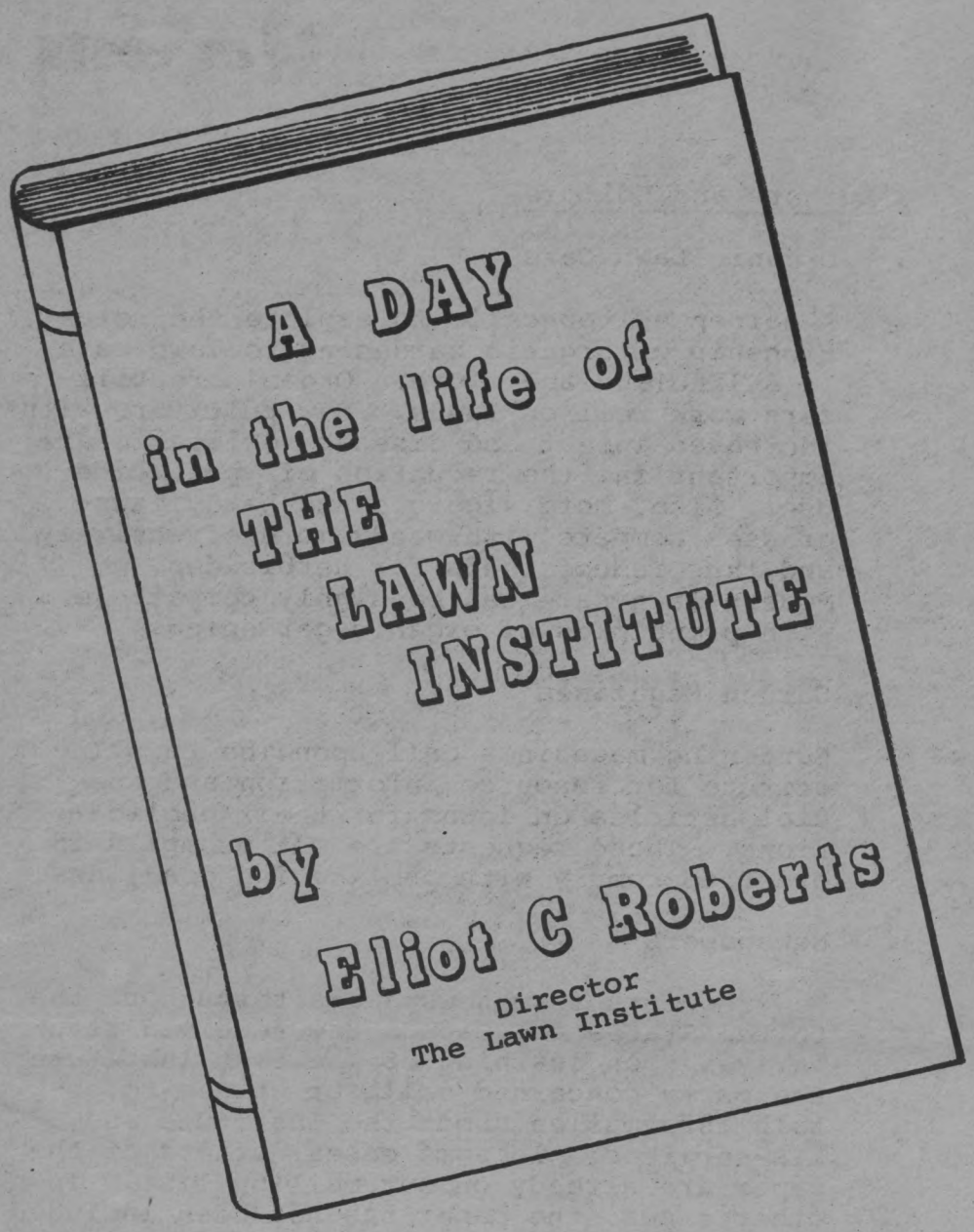
-Conference topics from Choice of Lawngrasses to Endophytes to Ecological Principles to Turfgrass Fertilization to Athletic Fields are discussed.

-Twenty nine technical research reports are summarized

-"Go For the Green" describes a spirit that makes lawns and gardens fun for millions of people the world over.

Director's Dialogue

(Editorial type commentary)



Visibility is important for organizations like The Lawn Institute. Public information/education/relations and membership releases and services provide a means for charting progress in this area.

Leaflets, Who We Are and What We Do and Lawns Across America, introduce the Institute and its turf and lawngrass mission to all concerned.

The quarterly newsletter, Harvests, provides an update on turf research and related topics.

Press Kits are released in spring and fall to lawn and garden communicators. These contain material on lawn care tailored for the northern cool, humid region.

Lawn Institute Special Topics Sheets (LISTS) feature lawngrasses used from coast to coast and from north to south.

The I Speak for the Lawn series provides a discussion of grass roots needs of lawngrasses with an ecological approach.

Reprints of articles published in turf and lawngrass trade magazines and in gardening journals provide in depth treatment of lawn care topics of seasonal importance.

The Variety Review Board releases lists of approved cultivars on a regular basis. These provide special recognition for selected bluegrasses, fine fescues, perennial ryegrasses, turf type tall fescues, bentgrasses and specialty grasses through use of the Seal of Approval. The Seal is also used on approved lawnseed mixtures and blends.

Special Lawn Institute Projects and Services (SLIPS) provide an opportunity for the Institute to enter into contracts and agreements for the conduct of research and special services for members and other individuals and groups.

Lawn-O-Gram is a log of Lawn Institute achievement in behalf of better lawns and turf. It provides a quarterly report to the membership.

These tangible products of Institute project and program activity are of importance in creating a fair level of visibility.

But, there is more than this in the daily life of The Lawn Institute. Contact with people having a wide range in turf and lawngrass interest keeps the Institute where the action is and in touch with a dynamic and growing segment of the green industry. Communications by both phone and postal service provide the headquarters office with an eye on the cutting edge of turfgrass research activity as well as up-to-date on the concerns of industry representatives and consumers alike. The following examples selected from files of recent contacts describe a "day" in the life of The Lawn Institute.

Education Related

- College

  Requests for printed material for use in teaching college courses in Turf and Landscape Management are received regularly. LISTS, reprints, Press Kits and Harvests provide a resource of up-to-date information to meet these needs.

- Elementary

  Youngsters learn of ecology and the environment at an early age. The Lawn Institute, through its "I Speak for the Lawn" releases offers elementary school teachers material appropriate for class use that is technically accurate.

Director's Dialogue Continued

Education related cont

- Playground Turf Improvement

  The Musser International Turfgrass Foundation has developed a program of playground turf improvement with the National Parent Teachers Association - PTA-PTI. This educational effort,directed by Dr Fred V Grau, is going to make playgrounds and sports fields safer for young athletes and all school children, simply by getting turfgrass under their feet. Files are being developed and maintained that contain resource information necessary to get this important task accomplished.

- Career

  Requests for information relative to career planning in Turf Management and related Ornamental Horticulture and Landscape Design are received regularly. A special brochure is needed; however, LISTS have proven helpful in directing parties to other organizations and associations that can be of direct assistance.

- Libraries

  Libraries associated with business firms, schools, colleges and communities are provided press kits, Harvests, reprints and LISTS upon request. The Lawn Institute is recognized as an information resource by these librarians.

Industry Related

- City Bureau of Park Maintenance

  City park departments are interested in The Lawn Institute and its educational programs. We attempt to meet their needs for up-to-date information in a prompt business like manner.

- Equipment, Chemical, Seed Correspondence

  Correspondence with equipment, chemical and seed companies results in the updating of files of information on products of current importance. The potential of the grass plant is usually only realized through the proper use of maintenance equipment and chemicals. Changes and new developments in these products are of critical importance in turfgrass management.

- Seed Control

  Matters pertaining to seed control are important to both seedsmen and consumers. Contacts with seed control officials provide a means by which lines of communication are kept open and exchanges of information are encouraged. Recently the issue of endophyte testing has become important.

Authors and Editors

- Organic Lawn Care

  A garden editor calls to explore the relationship of organic gardening to lawn care. It's like hand and glove. Organic fertilizers work well on lawns. New cultivars with increased insect and disease resistance are important in the reduction of pesticide use. Also, more vigorous and hardy lawngrasses compete with weeds more effectively and thus reduce needs for herbicides. Modern lawn care can be highly compatible with principles of organic gardening.

- Garden Magazines

  Gardening magazines call upon The Lawn Institute for resource information and special articles on lawns for their publications. These requests are met promptly in order to comply with publication deadlines.

- Newspapers

  New requests from newspapers throughout the United States and Canada are received regularly. Upon learning of The Lawn Institute, the party concerned calls or writes to obtain information about the Institute and its services. In some cases, others at the paper are already on our mailing list. In other cases, the paper has not been included on our mailing list. These corrections and additions are always made without delay.

- Editorial Contributions

  Review of technical research papers for agronomic and horticultural science journals provides an opportunity for The Lawn Institute to be of service. In addition, requests for assistance in the preparation of lawn and turf articles for use in books and monographs provide an extension of our expertise through these releases.

- Lawn Texts

  Authors of lawn booklets and books request latest information from The Lawn Institute. Back issues of Harvests, press kits, reprints and current LISTS are provided to help meet these needs.

- Book Reviews

  New books and booklets concerned with lawn care and turfgrass science are released each year. The Lawn Institute keeps up-to-date on these and provides reviews through Harvests.

Director's Dialogue Continued

Requests

- Trade Journals

  Special material is prepared upon request for use in specific issues of seed and turf related trade journals. These releases are similar to those used throughout the year but are modified to conform with editorial or format features of the issue concerned.

- Newsletters

  Other newsletters request permission to use Lawn Institute material in their publications. This is always granted,as one of the main purposes of the Institute is to provide accurate up-to-date information to other communicators for their use without restriction.

- Associations

  Requests for information from other organizations, associations and societies are broad based and cover a range of topics. In so far as possible, Institute knowledge of the lawn and turf industry and the individuals and firms that are leaders in this country is shared with others.

- Public Relations

  Public relations firms maintain regular contact with The Lawn Institute with the expectation that they may be of service to us. This possibility exists for special project assignments; however, to date, funding for these has been unavailable.

- Harvests

  Requests from all over the United States and Canada and from those countries represented by the International Turfgrass Society are received for Harvests. These requests are honored in so far as possible. Increased membership support will be necessary for this to continue much past the current level of distribution.

- LISTS

  Press Kit news releases are published throughout the cool, humid region of the country. Readers have the opportunity to obtain more information on proprietary cultivars by requesting copies of LISTS. These are sent in exchange for a self addressed stamped number ten envelope. LISTS are also available on warm season grasses and these are sent upon request to residents of southern states.

Information Search

- Bureau of the Census

  Contacts with organizations and bureaus that gather information helpful in the characterization of our society are useful in maintaining files on lawns and gardening. An expanded data base is needed. Gradually, information to help better answer questions on importance of lawns is being processed.

- Lawn Industry Survey

  Phone and written requests are received for lawn and turf industry survey data. Although data is available from a variety of sources, much of it is incomplete and totals don't always represent the sum of individual components. Bits and pieces are being gathered and filed by The Lawn Institute in an attempt to better describe the extent and complexity of lawn and turf agribusiness.

- Sources

  Requests for information concerning data and subject matter sources used by The Lawn Institute are serviced. As an educational organization, we try to be supportive of the need for individuals and groups to be able to search out facts and figures for themselves.

- Phone Call Follow Up

  Phone calls requesting information on the overall lawn and turf industry and on lawn seed trade are frequent. Accurate information is often not available and referrals are made to other individuals, firms or associations. Gradually, the headquarters office is developing an improved information base.

Turfgrass Research

- Turf Specialist Contact

  The headquarters office keeps in touch with turfgrass scientists throughout the United States and Canada and has research contacts in all countries represented by membership in the International Turfgrass Society. Up-to-date reports on cultivar evaluations, weed, insect and disease control, turfgrass culture and physiology,and mechanical and chemical grooming are monitored. In addition, correspondence concerning turfgrass research provides The Lawn Institute with an opportunity to provide industry perspective.

Director's Dialogue Continued

Turfgrass Research Cont

- Turf Workshop on Cultivars

  Proposals regarding turfgrass cultivar workshops have been formulated in an effort to make available more complete subject matter coverage for professional turf managers. A four hour presentation provides a reasonable update of current information.

- Turf Conference Program

  Turfgrass conference programs are planned months in advance. Contacts made with program chairmen throughout the year result in reservation of times and commitment to speak on specific topics. From this, a travel schedule is formulated for the year ahead. Phone calls and correspondence are necessary in working out these details.

- Turf Conference Follow-Up

  Turf conferences and field days provide an excellent opportunity to make new friends for The Lawn Institute. This requires follow-up correspondence from the headquarters office. Requests for leaflets are honored and names placed on appropriate mailing lists.

- Turfgrass Field Days

  Follow-up on data obtained from turfgrass field days is always necessary in making proper interpretations of the condition of observed plots. Pictures taken at field days are only of value when integrated with this data.

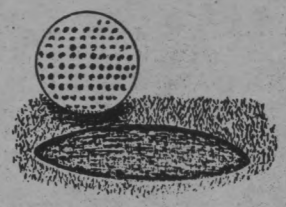
Organization Maintenance

- Memberships

  Requests for information on membership in The Lawn Institute are answered with enthusiasm. Member benefits are described as are the public education/relations projects and programs of The Institute. Increased support from new members is a key to continued program development and service.

- Member Service

  Members of The Lawn Institute have access to the services of the headquarters office. These include request for information relative to technical aspects of lawn and turf culture. Institute files are kept to such an extent that answers to questions should be readily available without delay.



- Membership Renewal Notices

  Membership renewal notices with information about the annual membership and Board of Directors meetings are required in mid May of each year. A computerized mailing is made so as to reduce the time necessary for this office operation.

- Address Changes

  Addresses change; even The Lawn Institute relocated two years ago. We are continuing to up-date our mailing address on the lists of other organizations and associations. With the aid of computerized mailing lists, we make modifications in our lists as promptly as we are informed of changes.

- Executive Committee Concerns

  Regular contact between the headquarters office and the Executive Committee is necessary throughout the year to maintain project and program relevance. Open lines of communication are realized through use of phone and postal service.

- Variety Review Board

  Regular contact is carried on with The Lawn Institute Variety Review Board. This involves developing and maintaining files on the proprietary cultivars reviewed by the Board.

- Seal of Approval

  Use of The Lawn Institute Seal of Approval on lawn seed blends and mixtures can be a significant benefit to some members. The headquarters office is pleased to assist with the development of appropriate public relations information to set up and service programs for use of the Seal.

- Past/Present

  Contact with Dr Robert W Schery, Director of The Lawn Institute for twenty five years is sustained. Dr Schery's wealth of understanding of seed trade affairs is of continuing assistance in the day to day conduct of headquarters office business. This consultation is appreciated.

Thus, the headquarters office of The Lawn Institute is a busy and interesting place to be. Never are two days the same. Because of this, a "day" in the life of The Lawn Institute provides challenge and satisfaction sufficient for both the Director and Office Manager.

P.O.BOX 108

(Industry Wide News and Views)

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Remember The Fall Planting Council's logo:

FALL IS FOR PLANTING™
TREES • SHRUBS
LAWNS • BULBS

For more information about the Council and its national public relations fall gardening campaign, contact: Mr Charles H McColough, President, Fall Planting Council, Inc, 5 Shawsheen Avenue, Bedford, Massachusetts 01730 or call (617) 275-3112.

INFORMATION ON LAWNS

Lawn care information is readily available across the country and it is presented in attractive,easy to understand format. Color pictures and step by step sketches of construction and maintenance practices make these reference materials particularly effective in developing lawns that are more satisfying and enjoyable.

Identification of grasses and weed,insect and disease pests help the gardener feel knowledgeable and authoratative on the subject of lawns and their needs. Numerous tables containing facts and figures take the guess work out of do-it-yourself practices and bring forththe realization that professional type results are attainable with minimal effort.

The following references are readily available and provide up-to-date recommendations for lawn care throughout the United States.

Lawns and Ground Covers
by Michael MacCaskey
H P Books 1982 176 pages
P O Box 5367
Tucson AZ 85703

Southern Home Landscaping
by Ken Smith
H P Books 1982 192 pages
P O Box 5367
Tucson AZ 85703

All About Lawns
Editions: Midwest & Northeast
South
West
Ortho Books 1979 96 pages
Chevron Chemical Company
Consumer Products Division
575 Market Street
San Francisco CA 94105

Lawns and Ground Covers
Sunset Books 1979 96 pages
Lane Publishing Company
Menlo Park CA 94025

Lawns and Ground Covers
by James Underwood Crockett
Time-Life Books 1971 159 pages
New York NY

NEW TURFGRASS SCIENCE TEXT

Professor Robert D Emmons, Plant Scientist at the State University of New York at Cobleskill, has just released through Delmar Publishers, Inc, a book entitled "Turfgrass Science and Management". Professor Emmons is responsible for programs in turfgrass and golf course management at Cobleskill. He has had experience as golf course superintendent and turfgrass extension specialist.

The new text emphasizes turf principles with an excellent blend of theoretical and practical. Cost/benefit considerations are related to recommended maintenance practices. A glossary provides definitions of special terms and an appendix offers charts on calculations and conversions as well as keys for vegetative identification of grasses. This book will not only be effective as a college text, but will also find use as a reference for practical turfgrass managers across the country.

Turfgrass Science and Management
by Robert D Emmons
Delmar Publishers 1984 451 pages
2 Computer Drive West Box 15-015
Albany NY 12212

Field Day Score Card

(Field Plot Evaluations)

Warvests 6

University of Tennessee

Turfgrass Management Research and Equipment Instruction Turf Day

Knoxville, Tennessee May 29,1984

The following turfgrass research studies were discussed and plots open for inspection:

Warm Season Grasses

- Both bermudagrasses and zoysiagrasses had suffered from winter kill and a severe spring growth recession brought on by unusually low temperatures. Emerald zoysia was severely affected.

Sprayers and Spray Techniques

- A demonstration and discussion of the application of fertilizers and pesticides using water as a carrier featured calibration, protective clothing and proper use of equipment.

Thatch Control

- Use of the core aerator, verticle mower, lime, topdressing, wetting agents and potassium for thatch control were initiated in 1979 on bentgrass putting green turf. Coring and verticle mowing were most effective.

Tall Fescue Cultivars

- A turf type tall fescue cultivar evaluation trial was seeded in 1979. All improved types produced high quality turf at this Knoxville location. Clemfine, Falcon and Rebel were among the top six in stand density. Clemfine and Falcon produced highest quality turf. Falcon and Rebel were observed to have highest Rhizoctonia brown patch resistance.

Perennial Ryegrass Cultivars

- A turf type perennial ryegrass cultivar evaluation trial was seeded in September of 1983. Of the twenty entries, only the check plot of common perennial ryegrass was inferior in any way as of May 29,1984.

Control of Crabgrass and Goosegrass

- Crabgrass and goosegrass seeded in bentgrass maintained as putting green turf has been treated with combinations of preemergent herbicides. Time of application and number of treatments are being evaluated.

Annual Bluegrass Control

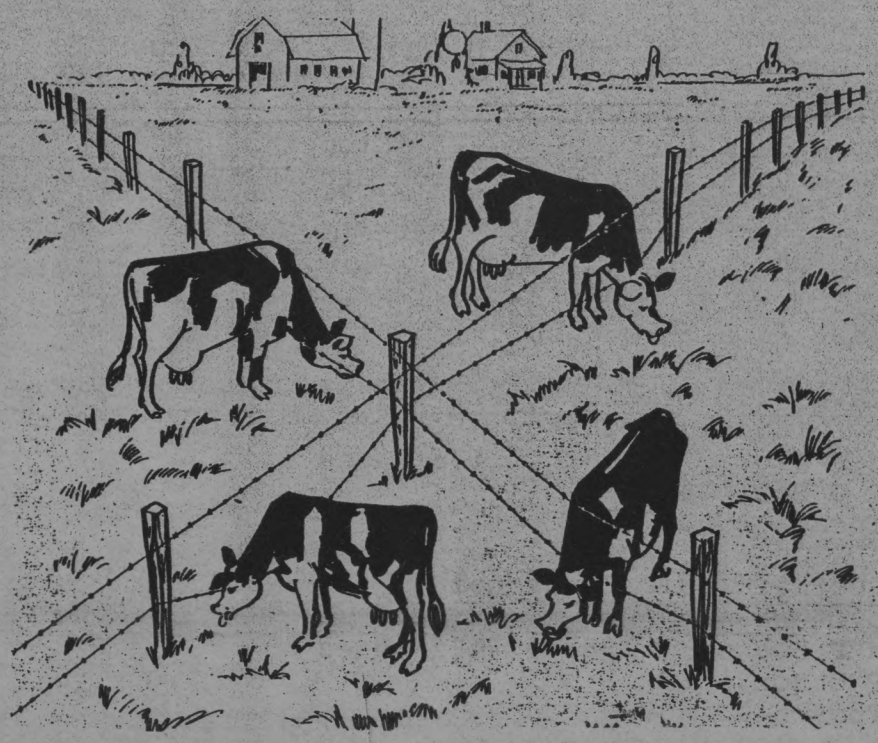
- Both perennial and annual types of Poa annua (annual types seeded) are being subjected to control treatments of bensulide. Various control programs involve time and rate of application. Most effective control was noted when herbicide was applied January 15, February 15 and March 20 at 10,5,and 5 pounds active ingredient per acre.

Mowing Demonstration

A discussion and demonstration of large and small reel mowers brought out points of importance in maintenance and use of mowers.

More Information

Contact Dr Lloyd Callahan at The University of Tennessee, Department of Ornamental Horticulture and Landscape Design, P O Box 1071, Knoxville TN 37901-1071.



Field Day Score Card CONTINUED

Southern Turfgrass Research and Information Exchange Group Meeting

Mississippi State, Mississippi June 12,1984

The following turfgrass research studies were discussed and plots open for inspection:

Nitrogen Source Study

The effect of nitrogen sources on turf quality is being evaluated. Melamine, UF and IBDU are included as treatments.

Overseeding Species/Cultivar Evaluations

Winter overseeding of bermudagrass putting green turf is being studied. Twenty one perennial ryegrasses, three annual and intermediate ryegrasses, three mixtures and two others (one fine fescue and one Poa trivialis) are included in these trials.

National Kentucky Bluegrass Trial

Eighty four Kentucky bluegrasses were seeded in September of 1980. As of June 1984, plots looked remarkably good.

National Perennial Ryegrass Trial

Fourty eight perennial ryegrasses were seeded in September of 1982. As of June 1984, plots looked very good.

National Tall Fescue Trial

Thirty tall fescues were seeded in 1983. All grasses established well and were attractive in appearance as of June 1984.

Nitrogen Source Studies

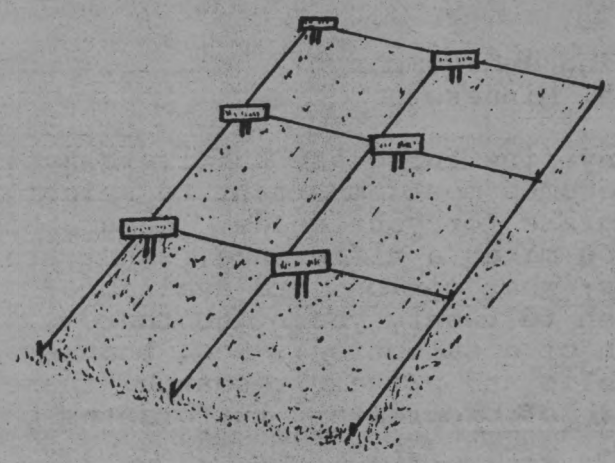
Nitrogen sources are being evaluated on Meyer zoysiagrass, Tiflawn and Tifway bermudagrasses. Ammonium nitrate, sulfur coated urea, IBDU and UF are included in these trials.

Tall Fescue Management Study

An evaluation of nitrogen fertilizer rate and timing of application and cutting height on turf quality of Kentucky 31 fescue is in progress.

More Information

Contact Dr Jeff Krans at Mississippi State University, Department of Agronomy, Mississippi State, MS 39762.



Weed Science Field Plot Research

- Purple nutsedge control in Tifdwarf bermudagrass;
- Annual grass control in bermudagrass;
- Winter broadleaf weed control - postemergence;
- Effects of nitrogen level on common bermudagrass tolerance to herbicides;
- Effects of nitrogen level on Tifway bermudagrass tolerance to herbicides;
- Effects of nitrogen level on centipedegrass tolerance to herbicides;
- Effect of additive centipedegrass tolerance to Poast.

For More Information on this research, contact Dr Euel Coats, Mississippi State University, Department of Plant Pathology and Weed Science, Mississippi State MS 39762.

Bowing to the mower,
Yet they know nothing about
classification,
Happy little weeds.

- HoRu Tsu-Na

Conference Topics

(Presentations of note)

Choosing Grasses to Fit Your Needs

Presented at International Institute on Park & Ground Management Meeting

Larry Vetter

Northrup King and Company
Minneapolis, Minnesota

With so many fine turfgrass cultivars available, it becomes most important to select the right grass for your needs. Geographical location makes a difference. What are the choices; what options are available? Some fifteen to twenty years ago there wasn't much of a selection. Now, thanks to both public and private research, there are a wealth of proprietary turfgrasses on the market.

According to Larry Vetter, there still is no perfect variety. Thus, it is necessary to identify the situation under which the grass will be used and then pick the grass or grasses with the right strengths. Mixtures containing different species or blends of the same species should be considered.

The following factors were listed by Larry as important in selecting the right grass:

- Location: cool, transition, warm, dry, humid or combinations of these;
- Quality expectation for intended use: high, medium or low;
- Maintenance budget - costs must be realistic. The low management fad is worthy of consideration;
- Athletic or sports turf uses involve appearance, safety, playability, hardiness and television esthetics;
- Functional nature of ground covers - all have limits of tolerance.

These factors must be identified, put in perspective and balanced realistically.

Many so called low maintenance grasses have come out of high management research programs. The pampering of grasses to make them look good still appeals to some gardeners; however, most prefer to minimize costly maintenance practices. The bluegrasses provide a good example of genetic diversity. When left alone, many grow much differently than when intensively managed. These differences in appearance make cultivars distinctive. Natural bluegrasses are more upright in growth while new cultivars have a more prostrate growth habit with more leaves for lower mowing. Some bluegrasses, like Merion, are heavy feeders; these look poor under low maintainance. Park, on the other hand,is a light feeder and looks better when not intensively maintained. Also, there is a difference in grasses depending on whether they are established at high maintenance levels and then these lowered over time, or whether they are established at low maintenance levels and these continued.

Larry feels that wear resistance and disease tolerance involve the same general ranking as follows: from high to low - tall fescues, ryegrasses, bluegrasses, fine leaved fescues, and bentgrasses.

Speed of establishment of lawngrasses is important. Larry's experience indicates that of the bluegrasses, Parade is fastest (about 7 days). Other bluegrasses establish in about 28 days. Delray perennial ryegrass establishes in about 10 days and has a slower growth rate than other perennial ryegrasses. Establishment and growth rates determine how much you can get for your labor dollar. Of the two,initial establishment costs are insignificant compared to continuing maintenance costs.

Fine textured perennial ryegrasses are really looking good- Larry notes the following strengths:

- wide soil tolerance;
- full sun grasses;
- moderate fertilizer needs;
- rapid germination;
- superior wear- crown is set low against soil, thus protected;
- good root systems;
- fine leaves;
- resistant to bluegrass diseases;
- no thatch;
- good heat and drought tolerance;
- good under close mowing.

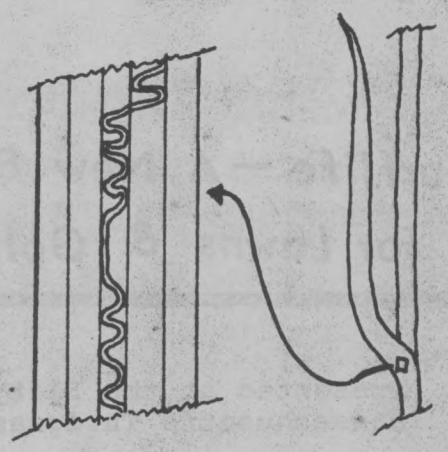
When asked for his seed recommendations, Larry Vetter gives the following:

- For relatively high management levels (four pounds per 1000 square feet of nitrogen per season and up)
  - 25 % Adelphi bluegrass
  - 25 % Parade bluegrass
  - 50 % NK-200 perennial ryegrass

- For medium management levels (two to three pounds per 1000 square feet of nitrogen per season)
  - 25 % Parade bluegrass
  - 25 % Rugby bluegrass
  - 50 % Delray perennial ryegrass

- For low management levels (under two pounds per 1000 square feet of nitrogen per season)
  - 100 % Galway turf type tall fescue

Endophytes in Turf Species



Presented at the Fifty third
Massachusetts Turfgrass Conference

Dr Leah Brilman

Jacklin Seed Company
Post Falls, Idaho

Endophytes are plants that live within other plants in such a way that neither injure the other. Fungus endophytes have been found in tall fescues and in perennial ryegrasses, as well as in some 26 grass species. According to Dr Leah Brilman, most fungi are considered the enemy of fine turf, but the endophyte is a friend because its presence increases resistance to some harmful insect pests. Disease resistance, heat and drought tolerance have also been attributed to the presence of endophytes.

The tall fescue summer syndrome, which is well recognized as a pasture condition causing livestock to make poor gains from grazing has been found caused by an endophyte. Presumably a toxin produced by the endophyte is responsible for this. In addition, ryegrass staggers in sheep has been noted in Australia and New Zealand.

The following observations concerning endophytes have special relevance to turf and lawngrasses:

- Endophytes are transmitted by seed. Storage of seed gradually results in the death of the endophyte. The endophyte decreases in viability more rapidly than decreases in seed germination. Seed stored less than a year maintains endophyte levels well. Endophyte cannot be sprayed on the plant, it must get there from the seed. A cold, dry storage of seed is conducive to keeping endophytes alive.

- The amount of endophyte needed to bring about insect resistance is not known. It works on crown and stem feeding insects. Roots have little endophyte in them; leaves are also low. Stem and crown tissue contains most of the endophyte when present. Once plants are endophyte infested, they stay that way, presumably the population is maintained from that in the crown.

- Fungicides may be used to kill out endophytes but high rate drenches are necessary. Normal rates of fungicides do not affect endophytes.

- Whatever the toxin is that brings about insect resistance, it would have to be consumed as a major portion of the diet in order to adversely affect warm blooded animals.

- Seed producers are interested in the following types of research information on endophytes:

  - How to handle production and marketing of seed so that there is no holdover from one year to the next ?

  - How to maintain seed stock for planting new seed fields of grasses containing endophytes ?

  - Effect of burning of fields on endophytes.

  - Can endophytes be added to other seed ?

  - Since endophyte populations are not stable within a variety, can they be considered a characteristic of the variety ?

- Testing for endophytes involves two stages. First, examination to determine its presence. Second, examination to determine if it is alive. The first step is relatively short in duration. The second requires a grow out that may take four to six weeks.

- Sodwebworm is one of the insects controlled by endophyte in some turf perennial ryegrasses. Pennant, Regal, All*Star and Repell contain endophyte.

- Tall fescues also contain endophyte and some evidence of increased tillering of these plants has been noted.

- Fine leaved fescues contain some endophyte as do some bluegrasses.

- This biological method of insect and disease control has great potential. The fungus is not a problem, it is one answer to increasing the ease of lawn care. New programs to help people know more about endophytes are just now getting started.

Turflife — A New Fertilizer for Lawns & Golf Courses

Presented at the Fifty third
Massachusetts Turfgrass Conference

Dr William Mitchell

University of Delaware
Newark, Delaware

Waste utilization by communities across the country has become a major challenge. Mountains of waste accumulate quickly. What can be done with it ? In Delaware, shredded solid waste has been tried as a soil amendment for sod production. Sludge, netting and chicken manure have also been studied for use by the sod industry. Dr William Mitchell has worked with a group in Delaware to build a 70 million dollar sewage and solid waste processing plant to utilize the 1500 tons of solid waste that accumulates daily. Composition of the raw material is three parts solid and one part sewage.

Vertical digesters work the mixture with aeration from the bottom. Following digestion, the material is pelleted (three sixteenth inch) dried, crumbled and screened to size. The material must be modified to make a good fertilizer. Various nitrogen sources have been absorbed by the material and evaluated on turf. Some 40,000 tons of this new fertilizer will be available annually.

In effect, the product is an organic carrier (50 to 80 % composted humus) for soluble nitrogen. A fast, early response is obtained with the material applied at one pound of nitrogen per 1000 square feet. Two pounds of nitrogen is too much. An analysis of 6-2-0 has worked well - fifty percent urea, fifty percent ammonium nitrate.

On golf greens some of the material is picked up by the greens mower. A finer particle size is being worked on. No burn has been evident at the two pound nitrogen rate. It is not a slow release product, as the nitrogen is absorbed by the organic particles, and yet there is no phytotoxicity as would be evident from just the nitrogen solution. It is thus a reasonably safe product to use.

The organic base will also be combined with herbicides for crabgrass control. The cadmium level is safe for use on lawns.

The White Papers

Presented at the Fifty third
Massachusetts Turfgrass Conference

Developing an All Weather Athletic Field from the Bottom Up

Ralph W White

Turfgrass Management Consultants Inc
Eustis, Florida

The quality of turf on natural sports fields depends entirely on management. All-weather football fields play safe rain or shine. Drainage is the key. Even though the ideal material to provide best drainage has not been discovered, a good job can be done with materials available when construction of the field is accomplished from the base up.

Ralph W White lists the following guidelines for doing the job right:

- First - determine how many games will be played on the field and during what seasons will games be played. This will indicate the level of management necessary.

- Second - determine the availability of trained people for the job to be done.

- Third - obtain rainfall and temperature data for the location. This influences decisions on the grass to use. For example, 419 bermudagrass is great for golf tees and fairways. Midiron bermudagrass is more cold tolerant than 419. Santa Ana bermudagrass is more tolerant of air pollution and may be best for southern California.

- Fourth - in existing stadiums, locate where all drainage and water outlets are.

Conference Topics

Continued

Developing an All-Weather Athletic Field Continued

- Fifth - find sources of crushed rock, sand, soil, organic amendments and have chemical and physical analyses run to determine proper mixtures to use.

- Sixth - excavate to get rid of the existing material. Go down twenty two inches on the edges of the field and ten inches in the middle to establish the subgrade. From twenty yard line to end zone, drop the grade from ten inches to twenty two. This will provide a crowned subgrade. Roll to make the grade firm.

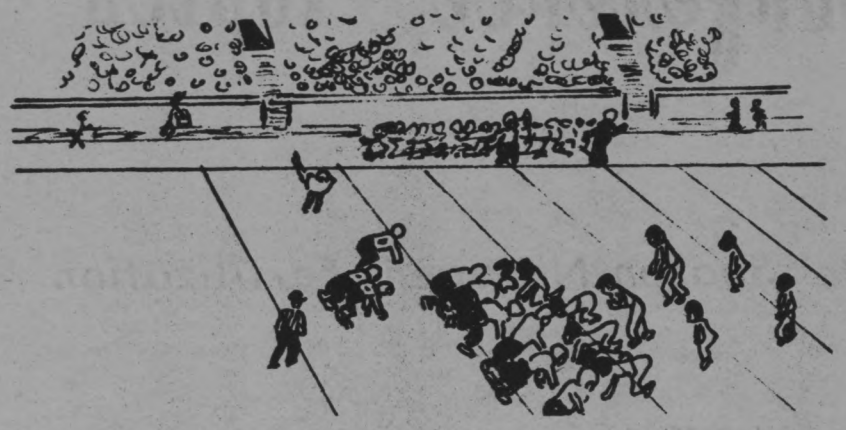
- Seventh - drainage systems are installed complete with catch basins. Use one quarter to one half inch crushed stone for the drainage field. Space drainage lines twenty feet apart and run them the length of the field. Use four inch corregated pipe and at the ends of the field, empty these into six inch pipe. Four catch basins, one at each corner of the field, are considered the minimum.

- Eighth - an irrigation system is installed. This should be permanent and underground and off field. Use six inch pipe around the field with snap valves. High volume irrigation guns that deliver a lot of water are ideal.

- Ninth - topsoil mix of sand and soil is the key to success of the whole project. Excess water must be removed from the topsoil within fifteen to twenty minutes. A four inch bed of pea gravel above the drainage tile and a layer of sand above the peagravel and the sandy topsoil above the sand will create conditions for the rapid downward movement of water. Since all sands are different, it is necessary to have them tested to determine if they are fine to medium. Very fine sands and coarse sands should be avoided. The right sand may perk thirty four inches of water an hour when compacted. With a little peat, it may perk twenty inches an hour. With twenty percent peat by volume, it may perk ten inches an hour. Sod and roots through the topsoil will further decrease the percolation rate. About twelve inches per hour is needed. Water can always be added. Drainage must provide a means to get rid of it. The modified topsoil layer should be fourteen to sixteen inches thick.

- Tenth - sod the field with grass grown on a mineral sand soil after the field has been flooded to settle the topsoil mix. Any irregularities must be worked out prior to sodding.

These ten steps should result in an excellent field with a two percent fall from fifty yard line to the end zones. The cost should average about $3.50 per square foot to construct. A twenty game season will prove to be no hardship for such a field.



Ecological Principles of Turfgrass Management

Dr Donald B White

University of Minnesota
St Paul, Minnesota

According to Dr Donald B White, golf course superintendents and turf managers in general should be considered resident ecologists. They utilize non conventional approaches to land management. Basic principles of ecology are used to analyze and explain lawn and turf conditions. It is the management of competition, a management of differences in plant growth and development. The existence of differences provide opportunity for achievement. The following tips indicate how these ecological systems work -

- Grow grass when conditions are best;
- All plants are different and have different requirements;
- An optimum set of conditions, including levels of all growth factors exists for each cultivar. It is important to know what these optimum conditions are. The optimum involves long range treatments. Maximum conditions are concerned with short range treatments;
- Many different limits of tolerance exist for each cultivar. It is important to know of these. Plants that are pushed for a long time beyond their limits of tolerance take a long time to recover. Both lower and higher limits of tolerance exist;
- Turf management requires flexibility. Interactions cause one treatment to affect the results of another treatment. When things are going wrong, identify the factor furthest from the optimum and correct that condition first. All the other factors will then be a little closer to the optimum;
- A systems approach is required in making turf management decisions. It is necessary to deal with populations of plants, not individuals;
- Effects of previous practices are accumulative and influence turfgrass response long after the practice may have been discontinued.

Late Season Nitrogen Fertilization

Dr Donald B White

University of Minnesota
St Paul, Minnesota

Turfgrass nutrition during late fall has received increasing attention in recent years because it is like a two sided coin that features beneficial root and turf response on the one side and increased disease and loss of cold hardiness on the other. Dr Donald B White is in a good position at the University of Minnesota to evaluate these nitrogen fertilizer effects. The following observations are worthy of note:

- Success in the overwintering of turf results from the accumulation of many good things. It involves an understanding of how turfgrass plants grow, the nature of hardiness in grasses, and the different causes of winter kill.

- In turf, both annual and perennial grasses essentially live out their life cycle annually. Annuals regenerate from seed; perennials from crowns which replace lost culms year after year. Tops are annual. There are just so many leaves associated with each stem. Culms may die with seed production or culms may be clipped and die off with summer or winter dormancy. Life persists in crowns, rhizomes and stolons of perennial grasses.

- Seed is a sink or target for photosynthate that is harvested in mid August. If seed is not formed because of regular defoliation, roots and crowns become the sink.

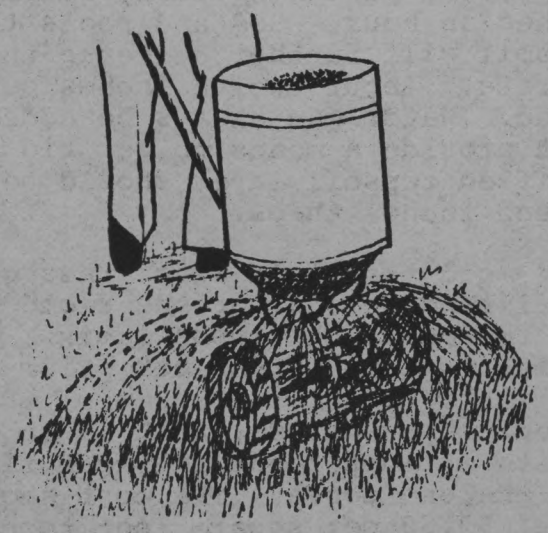
- Respiration in summer is high and this causes a "burning up" of stored carbohydrates. No reserves accumulate at this time. The grass is spoon fed, so to speak, during hot summer weather.

- Turfgrass reserves must be accumulated at other times of year than the summer. As temperatures drop in late summer and early fall, photosynthesis registers net gains as fall respiration rates drop. More photosynthate is produced than is "burned up". Thus, fall is turf making time.

- Applications of nitrogen produce a demand on the plant for carbohydrates. The prime growth stimulation is in foliage. This sets up a carbohydrate production system for the whole next year. Fall growth is thus the key to successful turf maintenance during the following spring and summer.

- Raise the clipping height just a little in the fall to provide more leaf surface for increased photosynthetic capacity. This is just a matter of growing grass when the environment is conducive to growing grass. Get the turf ready for late season nitrogen treatments. Make phophorus and potassium applications as needed. These treatments should not reduce cold tolerance and nitrogen response is noted from applications made up to two weeks of a solid freeze.

- Applications of ammonium nitrate act like slow release nitrogen the following spring. A uniform growth response results and turf has been noted to be more wear tolerant. Soluble fertilizers applied two to four weeks before freeze up work well. Slow release fertilizers must be used more than four weeks prior to freeze up for best results. As much as eighty percent of the green matter overwinters in Minnesota as a result of these applications. Treatments involving one pound of nitrogen per 1000 square feet in September, October and June have produced excellent results. At other times of the year, color can be improved by use of iron.



THRESHING THE JOURNALS

(Published research results)

PLANT GROWTH RESPONSE TO SEVERAL ALLELOPATHIC CHEMICALS

N L Shettel and N E Balke

Weed Science Vol 31 Number 3 293-298

Plants produce many different compounds as they grow. Little is known concerning benefits of these to the plant. Some may serve as protective agents that aid in disease and insect resistance or prevent the encroachment of other plant types. Allelopathic effects are known to be of importance in interactions among plant species within both cultivated and natural systems. These compounds likely inhibit growth of other plants directly upon decomposition.

Allelopathic chemicals include the following compounds:

- phenolic acids - Salicylic acid has been identified in decomposing rye and corn residues and in soybean leaf tissue. p-Hydroxybenzoic acid is one of the most commonly identified benzoic acid derivatives involved in allelopathy. It has been found in corn, wheat, sorghum and oat residues, soybean leaf tissue and cropped soils in many parts of the world.

- alkaloids - Caffeine is found in higher plants and is known to inhibit seed germination.

- coumarins - Umbelliferone is found in the resins of plants. It may serve as a protective compound produced in response to infection by plant pathogens.

- quinones - Hydroquinone has been found in the leachate of Eastwood manzanita. It inhibits root growth of brome and wild oat.

Investigations concerning how allelochemicals can be used in crop production are under way. These include breeding plants for increased production of chemicals that inhibit weeds. Natural herbicides may be produced from phytotoxic chemicals synthesized by some plants. The objective of this research was to compare the influence of five representative allelopathic chemicals on growth of several crop and weed species.

In general, results indicated differential toxicity of the allelopathic chemicals among the test species. Rate and method of application influenced results. In agro-ecosystems , these chemicals could selectively inhibit weed species. This inhibition would depend on concentration and distribution in the soil as well as on crop and weed species involved.

INITIAL AND RESIDUAL HERBICIDE CONTROL OF CRABGRASS IN BERMUDAGRASS TURF

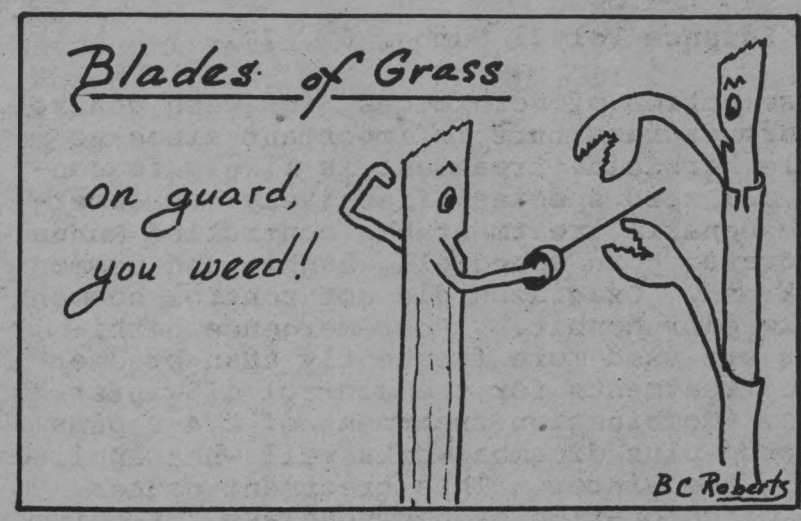
L M Callahan, J R Overton and W L Sanders

Weed Science Vol 31 Number 5 619-622

Large crabgrass continues to be a serious weed problem in turfgrasses. In a nine year study in western Tennessee, bandane, ben - sulide, DCPA, and terbutol applied preemergence controlled 94 to 100 % of large crabgrass in lawn turf of common bermudagrass. Recommended rates of application are:

(Granular)	Herbicide	Kg/ha	pounds/ acre	oz/1000 sq ft
10 %	bandane	67	60	20
12.5 %	bensulide	11	10	3
2.5 %	DCPA	22	20	7
5.5%	terbutol	22	20	7

Bandane and bensulide persisted in soil to control large crabgrass a year after treatment.



EFFECTS OF EDGING HERBICIDE TREATMENTS ON BERMUDAGRASS AND WOODY ORNAMENTALS

B J Johnson

Weed Science Vol 31 Number 5 707-711

Because bermudagrass grows and spreads rapidly, it creates an edging problem along sidewalks, curbs, fences and around ornamentals. Control of bermudagrass spread without injury to woody ornamentals in these areas has been investigated using glyphosate, and dalapon.

From ninety to ninety five percent control of bermudagrass is common for periods of two months. Highest bermudagrass control with glyphosate requires that the grass must be green at the time of treatment. Paraquat severely injures bermudagrass for two to three weeks but it fully recovers after two months.

Effects of Edging Herbicide Treatments Continued

Thus, chemical edging with paraquat requires more frequent applications than glyphosate or dalapon.

In tests around andorra juniper, dwarf burfordi holly, Japanese holly, Youpon holly, red tip photinia, pyracantha, flowering cherry, and flowering dogwood, no injury was noted from applications of glyphosate, dalapon or paraquat directly under the foliage. Glyphosate and dalapon applied at four week intervals gave good control of bermudagrass. Paraquat applied seven times during the growing season did not adequately control bermudagrass.

RESPONSE OF FOUR BERMUDAGRASS CULTIVARS TO FALL-APPLIED HERBICIDES

B J Johnson

Weed Science Vol 31 Number 6 771-774

The selection of herbicides for weed control in bermudagrass turf is important since no single herbicide treatment is likely to control all weed species effectively. Preemergence benefin treatment has controlled annual bluegrass, corn speedwell, henbit and common chickweed. Oxadiazon did not control common chickweedor henbit. Postemergence herbicides are used more frequently than preemergence treatments for the control of winter weeds. Combination treatment of 2,4-D plus mecoprop plus dicamba works well when applied during the winter. This treatment causes leaf discoloration of bermudagrass following summer applications. Since postemergence herbicides may be used for weed control prior to bermudagrass dormancy in the fall, an experiment was conducted to determine the effects of late summer and early fall 2,4-D plus mecoprop plus dicamba treatments on turf tolerance and winter survival of Tifway, Tifgreen, Tifdwarf and Ormond bermudagrasses.

The combination treatment applied at the normal recommended rate injured actively growing bermudagrass following August, September or October applications, but did not affect winter survival. A triple rate delayed spring growth of Tifgreen and Tifdwarf the following April. Because of reduction in turf stand from treatments made in August and September, more common chickweed was observed. Fewer weeds were noted in Tifway and Ormand turf than in Tifgreen and Tifway plots.

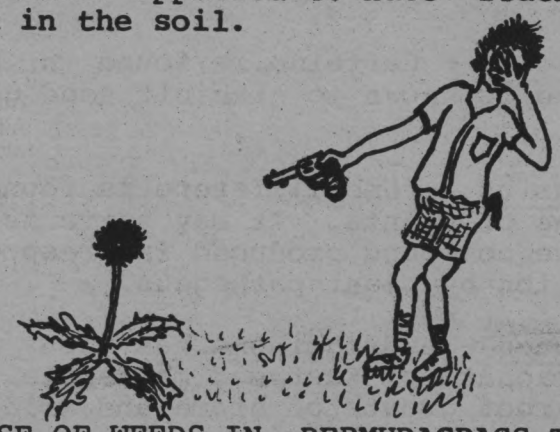
EIGHT YEARS OF HERBICIDE AND NITROGEN FERTILIZER TREATMENTS ON KENTUCKY BLUEGRASS TURF

J J Murray, D L Klingman, R G Nash & E A Woolson

Weed Science Vol 31 Number 6 825-831

From 1974 to 1981 annual applications of nitrogen at three rates, two broadleaf herbicides and six annual-grass herbicides were made on Kentucky bluegrass turf consisting of a 1:1 blend of Merion and South Dakota common. Nitrogen treatments consisted of 0.5, 1.0 and 1.5 Kg/200 m^2 (0.5,1.0 and 1.5 pounds per 1000 square feet) applied in September, October, November and December. Broad leaf herbicides used were 2,4-D plus Silvex and 2,4-D plus dicamba. Annual-grass herbicides included DCPA, bensulide, benefin, DSMA, siduron and calcium arsenate.

Results of nitrogen treatments indicated fewer dandelion and crabgrass plants as nitrogen level increased. A more dense turf and more competitive plants with higher nitrogen provided weed control. High quality turf was also produced at low nitrogen levels when an effective annual-grass herbicide and broadleaf herbicide were used. Only DSMA caused any discoloration of the turf. Residues of most herbicides were detected in the soil a year after treatment but not a sufficient amount for weed control. There was no accumulation over the years except for DSMA and where arsenic appeared to have reached equilibrium in the soil.



RESPONSE OF WEEDS IN BERMUDAGRASS TURF TO TANK-MIXED HERBICIDES

B J Johnson

Weed Science Vol 31 Number 6 883-888

Generally in bermudagrass turf preemergence herbicides are used to control summer weeds and postemergence herbicides are used to control winter weeds. Several herbicides are available in each category and some are more effective than others for any given weed. Tank mixing of two or more herbicides is desirable because of the reduced expense of making one application. However, tank mixed herbicides are not always compatible and may not perform as well as separate treatments. Experiments were conducted to determine the limitations of various tank-mixed herbicides on the control of winter and summer weeds.

Response of Weeds in Bermudagrass Continued

It was found that glyphosate applied in tank mixtures with DCPA controlled a higher percentage of parsely-piert than either herbicide alone. DCPA was antagonistic in the tank mixture with simazine when used on spur weed. Large crabgrass may be less well controlled with combinations of DCPA and glyphosate than when treated with DCPA alone. Less large crabgrass control was obtained with bensulide in combination with either paraquat or 2,4-D plus mecoprop plus dicamba than when treated only with bensulide.

SCREENING OF TURFGRASSES AND CLOVERS FOR USE AS LIVING MULCHES IN SWEET CORN AND CABBAGE

A G Nicholson and H C Wien

Journal of the American Society for Horticultural Science Vol 108 Number 6 1071-1076

Soil compaction, loss of soil structure and decreases in soil organic matter are of increasing concern in vegetable culture as production practices intensify and rotation of vegetable land with forage and pasture crops is virtually eliminated.

Living sod intercropped with row crops has been suggested as a means of alleviating this soil compaction. Thirty grasses and fifty two legumes were screened as ground cover suitable for use as living mulches. Objective of this investigation was the establishment of a good ground cover with little or no crop suppression.

Chemical suppression of forage grass growth was found necessary to prevent competition and this practice considered undesirable. Turfgrass species were evaluated to find more suitable, less competitive types.

The most promising living mulches were found to be the shorter, less vigorous turfgrasses (Chewings fescues and Kentucky bluegrasses) and 'Kent' wild white clover. These did not affect either sweet corn or cabbage yield. It was concluded that some compromise must be found between improving soil tilth and limiting competition with vegetable crops when living mulch growth is not regulated. When living mulch stands are two to three years old, competition is likely to increase, especially very early in the season.

KENTUCKY BLUEGRASS GROWTH AND WATER USE UNDER DIFFERENT SOIL COMPACTION AND IRRIGATION REGIMES.

K J O'Neil and R N Carrow

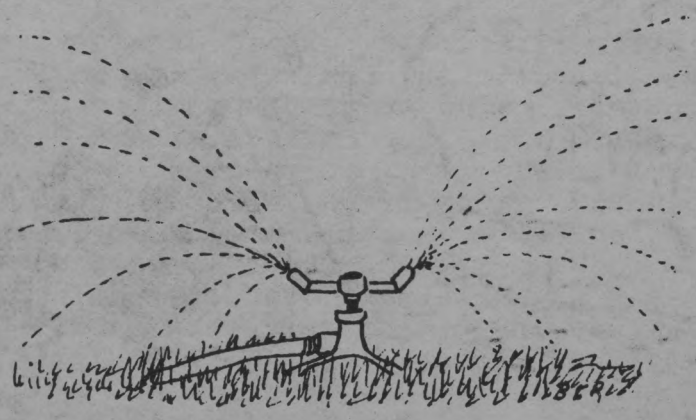
Agronomy Journal Vol 74 Number 6 933-936

Foot and vehicular traffic is a problem on recreational turfgrass because it compacts the soil surface. Compaction alters physical soil properties which in turn affect plant growth and water use. The major soil physical changes resulting from compaction are reduced aeration porosity, increased bulk density, increased soil strength and altered pore size distribution. These have a detrimental effect on root growth and shoot growth and reduce carbohydrate reserves so that turf quality declines. Soil compaction is often referred to as a hidden stress because effects on plant growth are not immediately visible and are always indirect.

Research on how soil compaction affects turfgrass irrigation is limited. The objective of this study was to determine the effects of compaction on water utilization and turfgrass growth under varying irrigation practices on a Baron Kentucky bluegrass turf.

Soil compaction had no effect on root weight or distribution. Visual quality, shoot density, verdure and percent total cover were reduced by compaction. In the surface inch of soil, compaction increased bulk density and moisture retention and reduced aeration porosity. Irrigation did not affect soil physical properties.

Without affecting turf quality, water use with tensiometer was reduced by 28 % on noncompacted soil and by 48 % on compacted soil compared to set-schedule irrigated plots. Soil compaction reduced water use by 20 % over a four month period. Altered moisture retention properties and reduced shoot growth were believed responsible. Thus, compacted and noncompacted sites should be irrigated on separate schedules.



NITROGEN SOURCE EFFECT ON NITRATE AND AMMONIUM LEACHING AND RUNOFF LOSSES FROM GREENS

K W Brown, J C Thomas and R L Duble

Agronomy Journal Vol 74 Number 6 947-950

Sandy rooting media of golf greens feature rapid infiltration rates and resist soil compaction. Water leaching through the soil has the potential for nitrogen pollution of nearby ground water. Investigations conducted in Texas on Tifdwarf bermudagrass produced the following results:

- As much as twenty three present of the total applied nitrogen was lost;

- Ammonium losses contributed little to the total nitrogen loss; most was nitrate;

- Ammonium losses were greatest from Ammonium nitrate and least from IBDU. Intermediate were UF more than Milorganite, more than 12-12-12;

- Nitrate losses from various sources decreased in the order: ammonium nitrate, 12-12-12, Milorganite, IBDU, UF;

- IBDU exhibited a very uniform release rate;

- Milorganite did not release nitrate to the leachate for a twenty five to thirty day period following treatment;

- Ammonium nitrate and 12-12-12 released nitrate to the leachate within five days after application.

- Regular moderate applications of slow release nitrogen provide minimum nitrate loss while supplying continuous nitrogen.

KENTUCKY BLUEGRASS TOLERANCE TO CONSECUTIVE PREEMERGENCE HERBICIDE TREATMENTS

B J Johnson

Agronomy Journal Vol 74 Number 6 1063-1066

Applications of herbicide are often necessary for the maintenance of weed free turf. Adelphi, Vantage, Victa, Merion, Fylking and common Kentucky bluegrasses, grown in the mountain region of Georgia, were subjected to annual herbicide treatments. Results with bensulide, benefin, DCPA, and oxadiazon applied at recommended rates reduced quality of turf in early spring but did not affect turf stand. Quality of turf varied during the four year treatment period; however, turf fully recovered from any observed herbicide injury during late spring and summer. Stress from high temperatures did not affect the performance of herbicides on these bluegrasses. Care should be taken to limit herbicide treatments to recommended rates. Neither napropamide nor prosulfalin should be used on bluegrasses included in this study.

ANTHRACNOSE DEVELOPMENT ON ANNUAL BLUEGRASS IN RESPONSE TO NITROGEN CARRIERS AND FUNGICIDE APPLICATION

T K Danneberger, J M Vargas, P E Rieke and J R Street

Agronomy Journal Vol 75 Number 1 35-38

Anthracnose is a serious disease of annual bluegrass throughout the northern and pacific northwestern regions of the country. Triademefon fungicide has provided most effective control of anthracnose. Slightly less than two percent infected area, on turf treated with fungicide, and about thirty percent of the turf not treated with fungicide are characteristic. Type of nitrogen carrier had no effect on anthracnose development. Moderate nitrogen levels were associated with less disease than higher levels of nitrogen. Applications of nitrogen during June, July, August, September and November produced less disease than applications in April, May, June, August and September. This nitrogen program combined with fungicide applications controlled anthracnose most effectively..

THREADING THE JOURNALS CONTINUED

KENTUCKY BLUEGRASS SEED PRODUCTION CHARACTERISTICS AS AFFECTED BY RESIDUE MANAGEMENT

V G Hickey and R D Ensign

Agronomy Journal Vol 75 Number 1 107-110

Merion, Nugget, Baron, Glade and South Dakota Kentucky bluegrass cultivars were compared as a means of evaluating field burning and mechanical removal of post harvest residue. Seed productivity of bluegrasses is usually improved by open field burning of post harvest residue. This was 1.5 times greater in 1979, 1.6 times greater in 1980 and 1.7 times greater in 1981 than yields where residue was mechanically removed to one inch (2.5 centimeters). Compared with residue mechanically removed to three inches (7.6 centimeters) seed yields were 2.0,1.9 and 2.6 times greater under the burn treatment. The following observations were made:

- Panicle and tiller numbers were reduced where residue was mechanically removed;

- Tiller leaf sheath lengths were not different in response to burning and close residue removal;

- Rhizome weights were reduced where residue was burned;

- Root weights were not affected by method of residue removal;

- Increased tiller production was associated with decreased rhizome weights;

- Tiller apices control the upturning of rhizomes to produce new tillers;

- Burning functions to reduce tiller apical control of rhizomes.

PERENNIAL RYEGRASS GROWTH, WATER USE AND SOIL AERATION STATUS UNDER SOIL COMPACTION

K J O'Neil and R N Carrow

Agronomy Journal Vol 75 Number 2 177-180

Soil compaction is a serious problem on recreational turfgrass sites. Plant growth and irrigation management are affected by soil physical properties. Derby perennial ryegrass grown on a silt loam soil was subjected to none, moderate and high levels of soil compaction.

The following observations were made:

- Soil compaction increased bulk density, reduced aeration porosity, visual quality and shoot density; altered root distribution and reduced root density in the four to ten inch (10 to 25 centimeters) soil depth zone;

- Soil compaction had slight effect on verdure and individual shoot weight;

- Total clipping weights were reduced thirty eight and fifty three percent at the moderate and heavy compaction treatments. Clipping treatment effects were immediate following soil compaction;

- Root changes were not evident for some twelve weeks following soil compaction;

- Water use was reduced by twenty one and forty nine percent under moderate and heavy soil compaction;

- Water extraction from the four to ten inch zone decreased sixty nine to twenty seven percent of the total water extracted in the heavy compacted soil;

- With heavy compaction, oxygen diffusion rates were low for fifty three hours after irrigation;

- Non compacted soil had acceptable oxygen diffusion rates within five hours.

A CONTROLLED ENVIRONMENT SYSTEM FOR TURFGRASS RESEARCH

B J Augustin and K J Karnok

Agronomy Journal Vol 75 Number 2 306-308

A system which allows continuous and concurrent monitoring of both morphological (shoots and roots) and physiological (photosynthesis, dark respiration and evapotranspiration) responses of turfgrasses to controlled light intensity, light quality, day length, diurnal air temperature, soil temperature and relative humidity has been developed. Additional details on the design, construction and operation of this research facility are available on request from the authors.

RESISTANCES TO EVAPOTRANSPIRATION FROM A ST AUGUSTINEGRASS TURF CANOPY

D Johns, J B Beard and C H M vanBavel

Agronomy Journal Vol 75 Number 3 419-422

Some thirty to fifty percent of urban water use is for irrigation of lawns and ornamental plants. There is a need for turf culture to be oriented towards a balance between water conservation and the maintenance of high quality turf. An understanding of the fundamental processes governing evapotranspiration is necessary. Research on St Augustinegrass in Texas has shown that alteration of stomatal aperture, such as by use of a stomatal inhibitor,will not produce a substantial decrease in evapotranspiration from adequately watered turf. Manipulation of stomatal size or frequency through plant breeding is not likely to reduce evapotranspiration, which is influenced to a greater extent by environmental(external) factors than by internal factors.

AMMONIA VOLATILIZATION FROM FERTILIZED TURFGRASS STANDS

W A Torello, D J Wehner and A J Turgeon

Agronomy Journal Vol 75 Number 3 454-456

Nitrogen applied to turfgrass stands is subject to loss through leaching, denitrification or ammonia volatilization. On a Kentucky bluegrass turf growing on a silt loam soil of pH 6.4, ammonia volatilization occurred to a limited extent. From 0.2 to 2.3 percent of the nitrogen from sulfur-coated urea was lost through volatilization depending on rate of application.

PLANT GROWTH-REGULATING EFFECTS OF SYSTEMIC FUNGICIDES APPLIED TO KENTUCKY BLUEGRASS

R T Kane and R W Smiley

Agronomy Journal Vol 75 Number 3 469-473

Systemic fungicides may cause visible alterations in plant morphology. Color, growth rate and density of stand changes have been observed. Plant growth and stress responses contribute to the severity of many turfgrass diseases. Thus, these factors may influence disease control activity of systemic fungicides. In a test on Merion and Fylking Kentucky bluegrasses, systemic fungicides were compared with growth-regulating compounds with similar chemical and/or biological properties. Reductions in leaf growth rates, shoot densities and root weights resulted from the use of some fungicides. Chlorophyll content and total nonstructural carbohydrate have been increased from fungicide applications. These effects could influence the severity of stress related diseases such as Fusarium blight.

MOWER BLADE SHARPNESS EFFECTS ON TURF

D H Steinegger, R C Shearman, T P Riordan and E J Kinbacker

Agronomy Journal Vol 75 Number 3 479-480

Park Kentucky bluegrass and a bluegrass blend of Baron, Glade and Adelphi were tested in Nebraska for response to rotary mowing with a dull blade. The following results were noted:

- Quality was reduced by the dull blade;

- Leafspot incidence increased on Park, but not on the blend when mowed with the dull blade;

- Thatch accumulation was not influenced by treatment;

- Water use rates were greater when turf was mowed with a sharp blade;

- The dull blade produced reduced shoot density and less verdure;

- Twenty two percent more gasoline was used when mowing with a dull blade.

THREADING THE JOURNALS CONTINUED

TURFGRASS GROWTH, NITROGEN USE AND WATER USE UNDER SOIL COMPACTION AND NITROGEN FERTILIZATION

M J Sills and R N Carrow

Agronomy Journal Vol 75 Number 3 488-492

Pennfine perennial ryegrass grown on a silt loam soil was subjected to compaction treatments. Increased bulk density, water retention and soil strength and decreased aeration porosity were noted.

Turfgrass responses included:

- Visual quality, clipping yield, nitrogen use per unit area of sod, evapotranspiration and root growth declined with compaction;

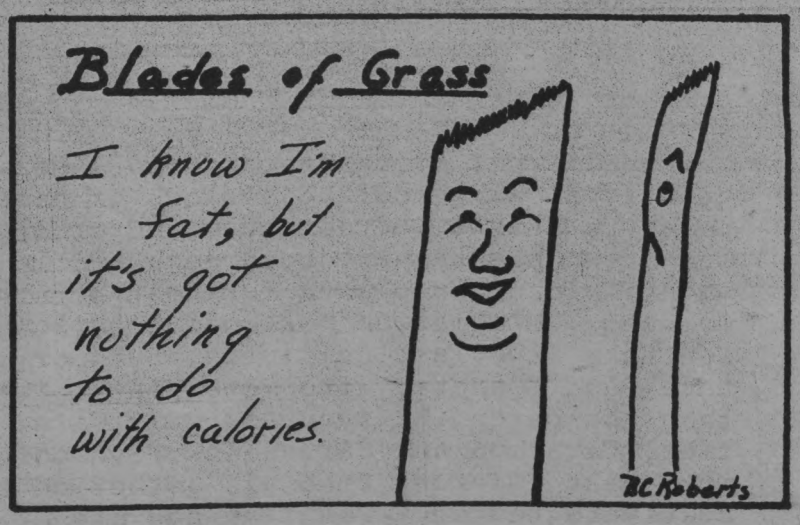
- Verdure, total nonstructural carbohydrate and percent nitrogen in the leaf tissue were not affected;

- Initial total nonstructural carbohydrate levels, water use efficiency and nitrogen use per unit are increased as nitrogen rate of application increased;

- Clipping yield, nitrogen use per unit area and water use efficiency were higher when water soluble nitrogen sources were used;

- The most detrimental effects of compaction were on root weight and distribution at the high nitrogen rate;

- Application of high rates of nitrogen will not compensate for the adverse effects of soil compaction.



SEED YIELD OF KENTUCKY BLUEGRASS AS AFFECTED BY POST-HARVEST RESIDUE REMOVAL

R D Ensign, V G Hickey and M D Bernardo

Agronomy Journal Vol 75 Number 3 549-551

Field burning of post-harvest residue is common practice for economical production of Kentucky bluegrass seed. Fields not burned soon after harvest usually have lower seed yields the following year. Residue that remains on nonburned fields shades existing plants and thereby restricts tiller growth and subsequent seed production. Screens that excluded thirty and sixty seven percent of sunlight were used on Baron Kentucky bluegrass starting in September and continuing for seventy five and one hundred thirty days. These treatments were compared with field burning, mechanical vacuum clipping at 1,3 and 6 inch (2.5, 7.6 and 15.2 cm) levels and no residue removal. It was concluded that reduced light penetration into the canopy could change plant growth and reduce seed production potential.

OXIDATION STATUS AND GAS COMPOSITION OF WET TURFGRASS THATCH AND SOIL

D C Thompson, R W Smiley and M C Fowler

Agronomy Journal Vol 75 Number 4 603-609

Excess thatch in turfgrasses is often associated with decreased plant vigor and increased disease susceptibility. Grass plants often root in thatch and this substrate possesses many prerequisites for anaerobiosis. Oxidation status and gas composition in unsaturated thatch of Kentucky bluegrass were evaluated with the following results:

- Thatch depth and a coring procedure did not influence thatch oxidation;

- Poorly oxidized conditions for periods over seven hours were measured;

- Temperature of thatch was important in governing the oxidation status;

- Phytotoxic products of poorly oxidized environments may accumulate in wet thatch on warm summer days. Thse may be deleterious to turfgrass health.

THRESHING THE JOURNALS CONTINUED

UREASE ACTIVITY IN A KENTUCKY BLUEGRASS TURF

W A Torello and D J Wehner

Agronomy Journal Vol 75 Number 4 654-656

Turfgrass ecosystems consist of plants, intervening layers of thatch and underlying soil. These components influence the fate of applied urea fertilizer. The loss of urea nitrogen by ammonia volatilization may be brought about by the rate of urea hydrolysis. A Kentucky bluegrass turf was studied with the following observations:

- On a dry weight basis, urease activity was eighteen to thirty times higher from turfgrass clippings and thatch than from soil;

- Thatch urease activity was variable in nature depending upon seasonal conditions;

- Soil urease activity was extremely stable;

- Because of the high level of urease in thatch, ammonia volatilization will occur from most urea-treated turfgrass stands regardless of type of underlying soil unless the urea is thoroughly washed into the soil.

GERMINATION AND INITIAL GROWTH OF KENTUCKY BLUEGRASS IN SOLUBLE SALTS

G L Horst and R M Taylor

Agronomy Journal Vol 75 Number 4 679-681

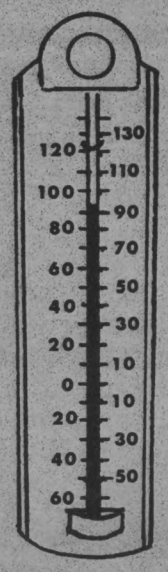
Kentucky bluegrasses are being introduced into the frequently saline, high altitude regions of the arid southwest where they are not well adapted. Cultivar evaluations were conducted using saline hydroponic solutions with 7,500, 12,500 and 15,000 parts per million of sodium and calcium chloride by weight on an equal basis. Different cultivars (44) had different germination and germination rate responses to salt stress. Differences were also observed in leaf blade length and fresh weight. Those cultivars having potential for commercial value under saline growing conditions had to average less than fifty percent growth reduction at the 7,500 ppm salt level. A salt concentration of 12,000 ppm would provide a suitable stress level for screening bluegrass genotypes for improved salt tolerance. Apomictic reproduction may limit genetic improvement from recurrent selection.

CULTIVAR VARIATION IN KENTUCKY BLUEGRASS: PHOSPHORUS AND POTASSIUM NUTRITIONAL FACTORS

B J Mehall, R J Hull and C R Skogley

Agronomy Journal Vol 75 Number 5 767-772

Kentucky bluegrasses vary in turf quality. Seasonal and geographic variability in density, color, inflorescence production and disease resistance are common. Differences in nutritional status of the grasses are seldom evaluated. Bluegrasses are generally considered at their best under high fertility levels. Some cultivars which perform well when maintained under low levels of fertility may be more efficient in their use of mineral nutrients. These may be expected to exhibit less seasonal and geographic variability and may prove to be of greater general use as fertilizer costs continue to increase. Fifteen Kentucky bluegrass cultivars have been studied with respect to their mineral nutrition. Significant differences between cultivars were obtained for all factors tested.



HEAT TOLERANCE SCREENING OF FIELD-GROWN CULTIVARS OF KENTUCKY BLUEGRASS AND PERENNIAL RYEGRASS

D D Minner, P H Dernoeden, D J Wehner and M S McIntosh

Agronomy Journal Vol 75 Number 5 772-775

The quality of cool-season turfgrasses frequently declines during periods of high temperature stress. Greenhouse and growth chamber-grown plants have been compared in tests with field grown plants for heat stress tolerance. Correlation has been good. The Kentucky bluegrass cultivars, Sydsport, Vantage, and Pennstar were more heat tolerant than the perennial ryegrass cultivars, Pennfine, Citation and Caravelle. Sydsport was more heat tolerant than all other genera and cultivars tested. Pennfine had higher recovery weights than the other two ryegrasses on some, but not all, sampling dates.

THRESHING THE JOURNALS CONTINUED

TURFGRASS EVAPOTRANSPIRATION: I FACTORS INFLUENCING RATE IN URBAN ENVIRONMENTS

C M Feldhake, R E Danielson and J D Butler

Agronomy Journal Vol 75 Number 5 824-830

While many factors affect evapotranspiration within urban environments, the microclimate conditions of a specific site are most important. Solar radiation and wind speed are influenced by the location of trees and various structures. The type of grass and management practices, such as mowing height and fertilization, are also important. The following observations have been made from studies conducted in Colorado:

- Merion bluegrass used fifteen percent more water when clipped at a two inch (5 cm) height than when clipped a little under one inch (2 cm);

- Thirteen percent more water was used by turf fertilized each month during spring and summer than was used by turf that received only one application in the spring;

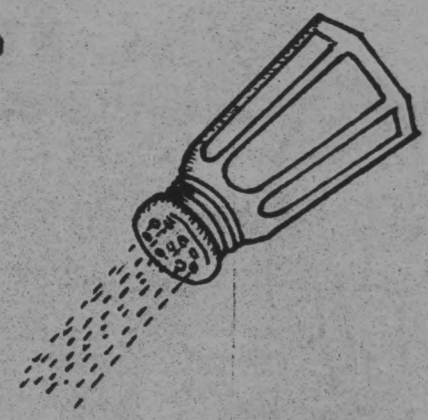
- Merion bluegrass and Rebel turf type tall fescue used more than twenty percent more water than Tifway bermudagrass and Nutt buffalograss.

TURFGRASS ESTABLISHMENT AFTER APPLICATION OF PREEMERGENCE HERBICIDES

S W Bingham and R E Schmidt

Agronomy Journal Vol 75 Number 6 923-926

Annual grasses create serious problems during turfgrass establishment from sod and seed. Midiron, Tufcote and Tifway bermudagrasses and Manhattan perennial ryegrass were evaluated for safe and effective use of preemergence herbicides, oxadiazon, prosulfalin and siduron. Oxadiazon treatments had less adverse effect on bermudagrass sod rooting than prosulfalin and siduron. Perennial ryegrass establishment in the fall was inhibited when seeded within five weeks after oxadiazon. Normal seedling development occurred when ryegrass was seeded ten weeks after prosulfalin or oxadiazon applications. Siduron had no effect on perennial ryegrass seedling growth and development.



EFFECTS OF SODIUM CHLORIDE ON BERMUDAGRASSES

A E Dudeck, S Singh, C E Giordano, T A Nell and D B McConnell

Agronomy Journal Vol 75 Number 6 927-930

Because of increased restrictions on water resources and because of salt water intrusion into ground water, there is a continuing need for more salt tolerant turfgrasses. Among bermudagrasses, Tifdwarf and Tifgreen were most salt tolerant while common and Ormond were most sensitive. Sodium increased and potasssium decreased in the tissue while total sodium plus potassium in top growth was unaffected by salt concentration. Tissue levels of total sodium plus potassium differed among cultivars.

MINERALIZATION OF NITROGEN FROM SEVERAL SOURCES AND ESTABLISHMENT OF 'PENNCROSS' CREEPING BENTGRASS ON PUTTING GREEN MEDIA

A R Mazur and C B White

Agronomy Journal Vol 75 Number 6 977-982

A comparison of two rooting media, one with seventy percent sand, twenty percent peat and ten percent sandy loam soil (by volume) and the other with seventy percent sand and thirty percent peat (by volume) was made using Penncross creeping bentgrass as a measure of differences in the use of ureaformaldehyde,(UF) sulfur-coated urea, (SCU) isobutylidene diurea (IBDU) and urea. The following results were recorded:

- The soil mixture initially had 490 times more nitrosomonas and 41 times more nitrobacter than the mixture without soil;

- After one month, there were no population differences in nitrifying bacteria between the two rooting media;

- Little if any urea or ammonia nitrogen was found in the leachate;

- The establishment of bentgrass was most rapid with the IBDU treatment in the rooting media containing soil. Even in the soilless mixture, establishment of bentgrass was greater where IBDU was the nitrogen source.

Lawn Institute Pitch

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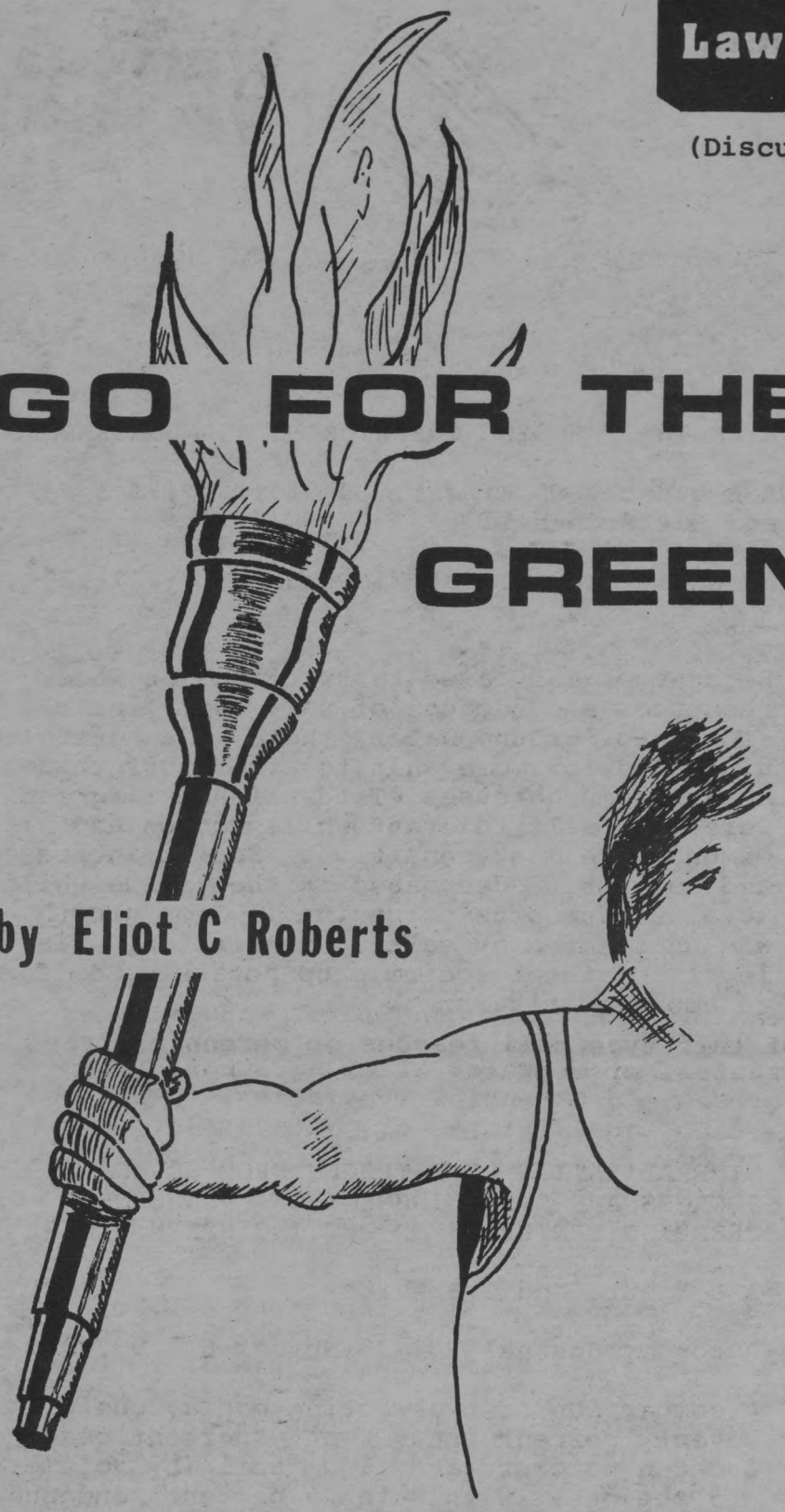
GO FOR THE GREEN



by Eliot C Roberts

With this, the year of the summer Olympics in the United States, we are all supporters of the concept "Go for the Gold". And, well we should be ! Americans are achievers and like to be winners.

They also know that there is gold in green. Gold that symbolizes a winning quality of life through the use of green plants to enhance our environment.

It is the miracle of chlorophyll that provides the green foliage of landscape plants. These signal within us a recognition of desirable habitat for humankind.

As our urban surroundings have become increasingly artificial through use of concrete and asphalt in the construction of buildings and transportation systems, we have begun to plan for the humanizing of these locations through creative use of plants. Professor Patrick Horsbrough, Architect at the University of Notre Dame, has considered the proximity of plants to people as a psychological imperative. As early as 1968, a U S Department of Agriculture Task Force published a "National Program of Research for Plants to Enhance Man's Environment". The critical importance of non food and fiber agriculture in the United States has become well documented.

The September 1983 issue of Lawn and Garden Marketing concluded its series "Growing the Market" with six articles under the heading "The Arett Strategy: Spurs Trends for Big Eastern Markets". The Arett Sales Corporation uses printed circulars in a thousand different ways to proclaim to millions of people that it's time for garden and lawn planting. During spring 1984, four million fliers were distributed.

The following highlights capture the spirit of this "go for the green" movement.

Irv Librett, President of Arett Sales Corporation, Cherry Hill, New Jersey -

"We talk about the keytrends and what radio and TV and the associations and the radio personalities can do for home horticulture and landscaping. They can originate and stimulate ideas. I don't think there's much the dealer or the wholesaler can do in this area. But, I think the dealers and distributors can cooperate by following trends and innovative programs, like "Fall is For Planting". Right now there is a craze in this country about health. Can we tie this industry into that ? Can we tie gardening into the aspect of physical exertion being healthful- in the garden- from a positive point of view ? Let's consider also that any time you mention gardening to a consumer, he thinks of a shovel and of 'work'; if we can turn that negative 'work' into a positive health activity and get the additional advantage of 'food and beauty', I think it would be tremendous. That's where we need the organization and cooperation of associations and media; the local people cannot do that. They can help it; they can support it; but they can't originate it."

Lawn Institute Pitch

Continued

"I think that when Lady Bird Johnson said 'beautiful is nice', that meant a lot more to the average person out there than Green Survival. The meaning of Green Survival is not clear to the retailers and the public. I think we should appeal to the aesthetic sense of the human being- that's what our whole industry is about. We have to do it subtly; and by doing that, as Mrs Johnson did it in some way, or as this health movement is doing, appealing to the person to be healthy, or just appeal to the consumer about beautification or happiness. That positive approach is what we need. It has to be a subtle approach. If we can somehow appeal to the emotions and the psyche of the human being, it would be tremendous for the industry."

"We are paving over the world with blacktop and cement. By doing that, we're losing trees and greenery. So now the individual in her or his house, is able to maintain some sort of relationship or communication with nature; collectively, they are desirous of doing this."

David Boylan, Vice President of Arett Sales Corporation, New Rochelle, New York.

"I think the dirt farmer instinct is in many of us. We like to see things grow, and we like to make them grow. It applies to raising your own food, or fertilizing your own lawn. I feel that there always will be a majority of the people who will be interested in taking care of their own lawns, their own gardens, taking care of the beauty of their place."

Linda Boutiller of Waterloo Gardens, Devon & Exton Pennsylvania believes that nature is more important than ever in urban life. The best seller, Megatrends, talks about the next era. Our society went from agricultural to industrial to high tech. High tech is plastic. It has nothing soft ,warm and natural. The public has a need for plants in their lifestyles.

Malcolm Downie of Rosedale Nurseries of Hawthorne, New York feels that Westchester County is the prettiest county in New York State. It is a corporate headquarters. People come there and live awhile, but they know they will be transferred out. While they're in the county, they want their homes to be showplaces. Each wants a place that is the prettiest place on the block.

While trees and shrubs provide a verticle orientation of green within the landscape, lawngrasses develop the green carpet upon which other plantings are located. Recent estimates indicate that of the 83 million households in the United States, 53 million have lawns. This amounts to about 6.5 million acres or some 10 times the total land area of the state of Rhode Island.

Drive faster, Mabel, I'll be late for my exercise class!

Caring for home lawns by do-it-yourselfers costs close to 4.25 billion dollars a year. Another 2.? billion dollars is spent for professional lawn care service.

Most estimates rate home lawns at from 60 to 70 percent of the total turf commodity based on either land area involved or maintenance costs. Lawn care score higher in many surveys than flower or vegetable gardening.

Most home gardeners fail to appreciate the magnificence of the ecological system that is within sight and under foot. Turfgrass normally consists of over 35 million plants per acre. An average sized home lawn of about 4,000 square feet will support over 3 million plants. These may consist of monocultures of turf type tall fescues or perennial ryegrasses, or mixtures of bluegrasses, fine fescues and perennial ryegrasses. Others develop from mixtures of bentgrasses and fine fescues. In southern parts of the country, bermudagrasses, zoysiagrasses, St Augustinegrasses, centipedegrasses and bahiagrasses usually are developed as monocultures.

These millions of tiny lawngrass plants hold our soil in place and aid in the infiltration of rainwater into the soil where it is stored for future use. Their roots create a microbiologically active soil that works to clean up and decompose pollutants that are all around us. In addition, they cool our surroundings in summertime as moisture evaporates from within leaf tissue. Lawngrass vegetation traps dust and dirt throughout the year and helps prevent the formation of mud which is slippery under foot and unpleasant when tracked into the house. Lawngrasses also take carbon dioxide out of the atmosphere and return oxygen,which we breathe, to the air. Active youth and adults alike play safe on well turfed playgrounds and athletic fields. And with all these benefits, goes the beautiful green of a landscape - picture perfect.

New proprietary lawngrasses provide an opportunity to upgrade old lawns from existing common types, by using more insect and disease resistant cultivars. Low maintenance lawns are now feasible as more efficient use of water, fertilizer and pesticides is being emphasized. This means that a more enjoyable lawnscape is within reach.

Many of us have found that just as interior decor should be changed from time to time, so should our lawns and gardens. We "Go for the Green" when enhancement of quality of life becomes our goal.

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The Better Lawn and Turf Institute is incorporated as a nonprofit business league formed exclusively for educational and research purposes concerned with agronomic, horticultural and landscape concepts.

Lawn Institute Harvests is dedicated to improved communications among turfgrass seed and allied turf industries and other firms, businesses, organizations and individuals with lawngrass research and educational interests and concerns.

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