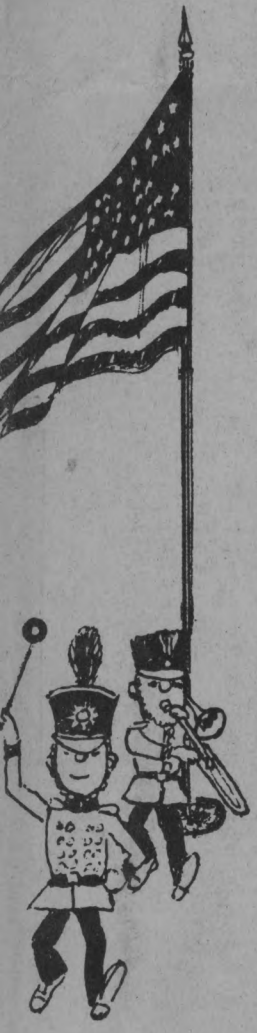
JULY 1985

LAWN INSTITUTE

Harvests

Volume 32 Number 2

THE HARVEST MIX

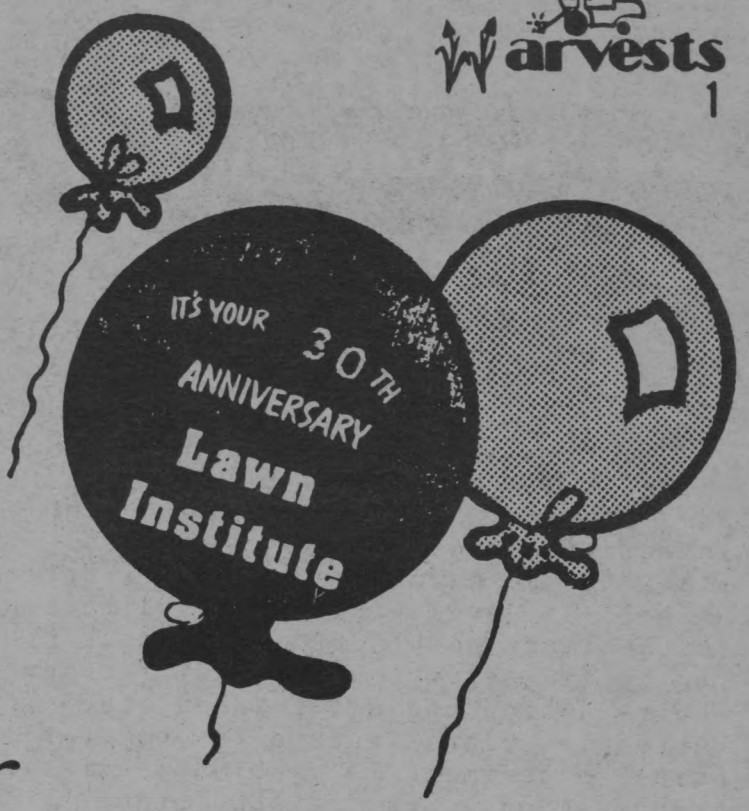


For thirty years now The Lawn Institute has served as an advocate for better lawns and turf. Harvests has become one of the major means for release of new technical information of importance to industry, business and practioner.

SO WHAT'S NEW ? This July issue provides a mix of brief reports that recognize:

- Planting Council and National Garden Week
- VertiGroove and Turf Repair Tools
- A Turf and Garden Fertilizer Handbook
- The Health and Fitness of Gardeners
- Landscape Architecture Guide
- Turf Diseases and Fungicides
- Zoysiagrasses
- Endophytes
- Cultivar Updates
- Research Report from GCSAA Convention
- Weed Seed/Soil Relationships
- Weed Control and Herbicides

It's all here and as good as dollars in the bank. Read, digest and then practice. Look for positive results.



Lawn Institute in Thirtieth Year

According to the Articles of Incorporation, on September 16,1985 The Lawn Institute will be thirty years old. This is far from a "Seniors" status, and yet, through thirty years of public education service, much has taken place in the way of organizational development. Basic goals are unchanged although turfgrass science has advanced considerably during this period.

An early statement by Dr Robert W Schery records the start of the new Institute and names many of those responsible for its establishment. The entire lawn and turfgrass industry is indebted to these men of vision for their early efforts.

THE BETTER LAWN AND TURF INSTITUTE

"The Better Lawn and Turf Institute" is a non-profit organization supported by lawn and turf seed producers and processors from all over the country in cooperation with state experimental stations.

The purpose of the organization is, as the name implies, to work for the improvement in many ways of America's grasslands whether they be home lawns, parks, golf courses, airfields, cemeteries or athletic fields.

A lineal descendent of such organizations as the Missouri Valley Blue-Grass Seed Growers Cooperative Association, formed nearly 25 years ago, the present Institute was formed in 1951 as the Bluegrass Research Institute to meet and answer a shower of requests for information on lawn and turf development.

In a short time it became increasingly obvious that a real public service program was the next logical step and that activities could not be confined to any single grass.

At a late fall meeting in 1954, Institute President Joe Peppard of Kansas City's Peppard Seeds, Inc, brought out the facts. Committees were appointed and reorganization work began.

On April 9,1955 the members of the Bluegrass Research Institute voted unanimously to change the name and establish a permanent central office at 2233 Grand Avenue, Kansas City, Mo, gather together books and pamphlets there for a library, and hire a staff.

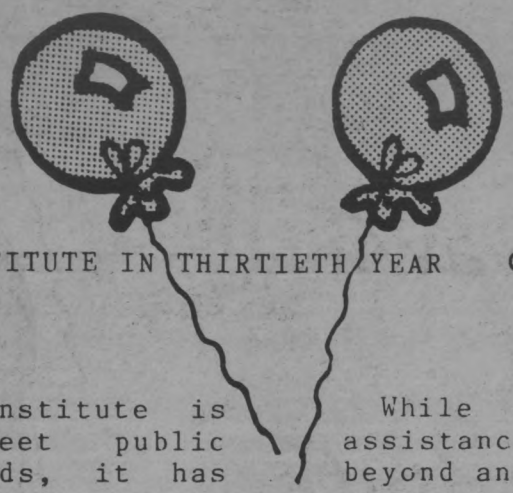
Mr Al Mangelsdorf of Ed F Mangelsdorf & Bro, Inc, St Louis, moved "that the name of the organization be changed to 'Better Lawn and Turf Institute.'" The motion was seconded by Mr Ed Spears of Woodford Spears and Sons, Paris, KY. At the same time, the new Institute was pledged to a definite five year program of public service.

Mr Carl Farris of Mitchellhill Seed Co, St Joseph, Mo was elected president and a policy making board, composed of William Gassner, Maupin Seed Co; Roy Edwards, Jr, Rudy-Patrick Seed Co; C B Mills, O M Scott & Sons Co; Al Mangelsdorf, Ed Spears, Joe Peppard and Carl Farris, was elected.

The Institute now has a library of more than 300 books and pamphlets and is publishing a series of lawn aid articles, pamphlets, information brochures and a directory of lawn care experts from coast to coast.

A partial list of Institute members and contributors includes such names as Bassett, Corneli, Creston, Kellogg-Kelly, Lang, Mangelsdorf, Maupin, Mitchellhill, Newday Seedsmen, Ouren, Peppard, Platte Valley, Rudy-Patrick, O M Scott, Spears-Kiser, Woodford Spears, Sphar & Gay, Sumner, Tobin, United, Vogt, and Wilson & Son.

Lawn Institute Pitch



LAWN INSTITUTE IN THIRTIETH YEAR **Continued**

While the Better Lawn and Turf Institute is at present designed to meet public information and home service needs, it has plans for research grants and experimentation as well as developing a fresh direct approach to the improvement of existing turfs. Since the public service efforts will encompass the entire nation and all grasses, the Institute currently plans intensive cooperation with state experimental stations, existing seed organizations and related branches of the turf grass industry on a strictly non-partisan basis, although the emphasis will be on the establishment of quality permanent turfs.

Institute consultants for the public information and home service division at 2233 Grand Ave, Kansas City, are Dr Robert Schery, a nationally known seed and turf expert; Mr Chester Mendenhall, a golf and athletic turf expert; and Mr Stanley McLane, a home lawn care expert.

The Institute's directory of <u>independent</u> advisors, as yet incomplete, lists :

Dr Leland Burkhart, Un of Arizona
Dr R D Staten, Un of Arkansas
Dean Lippert S Ellis, Un of Arkansas
Charles M Drage, CO A & M College
B A Brown, Un of Connecticut
Dean C C Murray, Un of Georgia
Dr F F Weinard, Un of Illinois
Dr William H Daniel, Purdue Un
Louis N Bass, Iowa State College
H L Lantz, Iowa State College
Ray A Keen, Kansas State College
W E Monroe, Louisiana State Un
Richard Stadtherr, Un of Minnesota
W R Thompson, Mississippi State College
E Marion Brown, Un of Missouri
Leonard A Yager, Montana State College
Dr Joseph H Robertson, Un of Nevada
Gordon B Hoff, NM College of Agr & Mech Arts
S H Dobson, NC State College
H A Woodle, Clemson Agri College
William G Macksam, SD State College
J K Underwood, Un of Tennessee
Etlar L Nielsen, Un of Wisconsin
Dr Glen M Wood, Un of Vermont
J F Shoulders, VA Polytechnic Inst
Kenneth J Morrison, State Coll of WA
R J Friant, WV University
Hal R Taylor, Un of Wyoming
C M Harrison, Michigan State College
Dr Ralph E Engel, Rutgers Un
Dr W C Elder, OK A & M College
I J Johnson, Iowa State College
Victor H Ries, Ohio State Un

While most of these men have offered assistance to the ideals of the Institute far beyond any call to duty, it must be stressed that their value as a body is through complete independence and non-affiliation.

Set up as a non-profit educational organization, the Institute welcomes assistance in its efforts to improve the nation's lawns and turf.

BOB RUSSELL HONORED

Norman Rothwell, President, presented a plaque to Robert A Russell at the ASTA Lawnseed Division meeting in Nashville, Tennessee. The inscription, "In recognition of enthusiastic support for The Lawn Institute and for inspiration and leadership instrumental in the development of policy and programs", describes Bob's service to the organization over the years. Being Secretary-Treasurer for 15 years is indicative of his sincere interest.

The Executive Committee, the members, and the staff congratulate Bob and look forward to many more years of close association.

P.O.BOX 108

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3

THE FALL PLANTING COUNCIL, INC.

UPDATE

From: The Planting Council
119 B Great Road
Bedford Massachusetts 01730

At this year's annual meeting, more emphasis was placed on the Council's efforts to unite the various segments of the industry for the benefit of all.

A major step in this direction was the decision of the Board of Directors and the members to expand the Council's focus beyond the Fall season.

This proposal, as well as one to modify the name from the Fall Planting Council, Inc to "The Planting Council," was approved by the Board of Directors.

The objectives of The Planting council are twofold:

1. To inform consumers about the joys and satisfaction to be derived from gardening, and, 2. To promote the sale and use of lawn and garden products and services.

"The Planting Council experienced tremendous growth this past year," Charles H McColough stated. "This success is due in large part to the contributions of our Board members who work on a voluntary basis. We are pleased that the Board represents a cross-section of the lawn and garden industry. This allows us to address the various needs of the industry."

"Membership increased over 100 percent in 1984," reported George Mikkola, Development Director. "Over 421 new members were added to the organization's rolls, bringing the total to 632 member firms, with over 6,000 firms participating."

For further information, write or call The Planting Council, Inc, 119B Great Road, Bedford MA 01730 (617/275-3112).

FALL IS FOR PLANTING
TREES · SHRUBS
LAWNS · BULBS

NATIONAL GARDEN WEEK

From: Nona Wolfram-Koivula
National Garden Bureau
628 Executive Drive
Willowbrook IL 60521

The National Garden Bureau has an urgent call to all Americans who garden. The Bureau is working to establish a National Garden Week. The purpose is to recognize the 43 million American households that eagerly garden and to attract those Americans who need encouragement to garden. A National Garden Week could be celebrated each year with gardening demonstrations, community beautification projects, or other such newsworthy events. A national week for national recognition of gardeners is the goal.

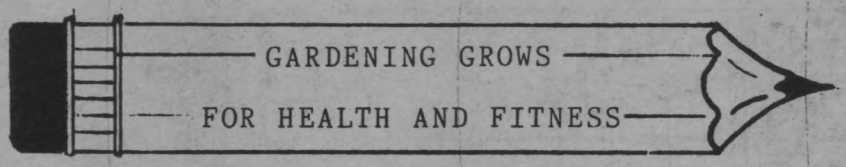
Senator Hatfield (Oregon) and Congressman Luken (Ohio) will introduce a joint resolution to authorize President Reagan to proclaim a National Garden Week for the third week of April.

We ask you to write your local congressman and senators. Your letter could mention the numerous benefits of gardening to Americans and urge your congressional representatives to cosponsor National Garden Week by contacting:

Senator Mark O Hatfield
Phone: Steve Nausen at 4-3753 (D C #)
OR
Congressman Thomas A Luken
Phone: Lynn Drabkowski at 5-2216 (D C #)

This resolution will be introduced into the House and Senate to authorize and request President Reagan to designate the week of April 13,1986 as "National Garden Week". With your letters, there will be a National Garden Week to Celebrate in April, 1986 !

For further information contact: Nona 312/655-0010.



From: Nancy Flinn
National Gardening Association
180 Flynn Ave
Burlington VT 05401

Gardening maintained its place in 1984 as the number one outdoor leisure activity of Americans according to Gardens for All, The National Gardening Association.

Thirty-nine percent of U S households are gardening in their backyards and in community gardens. Gardeners outnumber those who bicycle (33%), fish (30%), camp (23%), jog/run (22%), play golf (12%), baseball (11%) or tennis (11%), ski (7%), or sail (6%). These figures are the result of a poll released in January, 1985 by the Gallup Organization of Princeton, New Jersey.

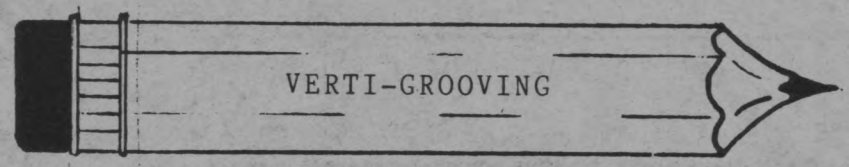
"The fact that gardening outranked skiing, sailing, golf and tennis combined is significant," said Charles Scott, President of Gardens for All. "The increased awareness of health, fitness and nutrition in this decade has changed the motivation for many leisure activities and in particular, gardening".

No longer is money-saving the number one reason people are gardening. The top three reasons Americans are gardening are: #1, for fresh vegetables; #2, for better tasting, quality food; and #3, for fun and enjoyment, according to the 1984-1985 National Gardening Survey.

"Americans continue to participate in sports and leisure activities at record levels reflecting their interest in health and fitness," said George Gallup, Jr. "We believe gardening has maintained a high rank among many people because of the healthful benefits they associate with gardening."

Our book, YOUR NUTRITIOUS GARDEN, features guidelines and plans for producing the most vitamin rich crops possible out of a backyard garden," said Scott of Gardens for All. "Getting this information and book into the hands of America's gardeners is important to us. YOUR NUTRITIOUS GARDEN can make a difference in getting gardeners in better health and shape," Scott said. We're offering it to our 250,000 members and the nation's 34 million gardening households."

Gardeners can send for the 44-page YOUR NUTRITIOUS GARDEN by enclosing $1 to cover postage and handling to Gardens for All, 180 KK Flynn Ave, Burlington, VT 05401.



From: Tom Mascaro
Turfgrass Products Corporation
2210 NE 124th Street
North Miami FL 33181

The Orange Bowl in Miami has been Verti-grooved. This may be the beginning of a new era for many athletic fields. Just as it took almost 30 years for aerification (with the Aerifier) to be accepted, it may take just as long for this new concept.

This new machine will cut 8 inch deep slits 1/2 inch wide at 2 foot spacing on a 2 acre field and have it ready for play in 8 hours. Fields that have had infiltration rates of 7 inches per hour reduced to 1 1/2 inches per hour because of root bound soil plus thatch can be improved with the Verti-Groove.

Ransomes is developing the prototypes and there should be a few demonstration models by fall. Look for them, and contact Tom for more information.

From: Gordon Witteveen
300 Clarence Street
Woodbridge Ontario L4L 1L7
Canada

A new turf repair tool has been introduced from Australia by Gordon Witteveen, Superintendent of The Board of Trade of Metropolitan Toronto Country Club. It is available in 6,8 and 9 inch sizes and cuts a perfectly sqaure hole almost 4 inches deep. The tool is ideal for repair of scars and scrapes, fertilizer spills, chemical burns and vandalism on greens.

Advantages of Turf Repair Tool:

- Perfectly square sods fit against each other. No spaces are left in between.
- Plugs are cut to the same depth and fit precisely.
- Minimal disturbance of the soil and roots. The grass keeps on growing.
- Greens can be played on immediately after having been repaired. No bumps !

For more information contact:
Gordon Whitteveen Enterprises Ltd
300 Clarence Street
Woodbridge Ontario L4L 1L7
(416/851-1968)

NEW GUIDE TO EDUCATIONAL PROGRAMS IN LANDSCAPE ARCHITECTURE

From: Karen Rosenfeld,
Director of Education ASLA
1733 Connecticut Ave NW
Washington DC 20009

The first directory of graduate and undergraduate educational programs in landscape architecture offered in the United States and Canada has been published by the Professional Practice Institute of the American Society of Landscape Architects (ASLA).

A Guide to Educational Programs in Landscape Architecture is a valuable tool for prospective students at both the undergraduate and graduate levels, providing for the first time a central source of information on programs in landscape architecture.

The Guide includes 43 undergarduate and 32 graduate landscape architecture programs in the United States and Canada. The directory provides information on application requirements and deadlines, tuition, faculty and student numbers, and a brief description of each program and its specializations. Graduate program listings also include biographical information on faculty and their areas of specialty.

The introductory section is a general description of educational programs, the profession, job opportunities, licensure procedures throughout the United States and organizations associated with landscape architecture.

The academic directory, softcover, more than 100 pages, is available for $4.00 per copy (plus $2.00 per copy UPS postage and handling). To order, send checks for the full amount, payable to ASLA, to American Society of Landscape Architects, 1733 Connecticut Avenue NW, Washington DC 20009 (202/466-7730).

The Professional Practice Institute of ASLA, which publishes the directory, provides services and products geared to each specific type of landscape architectural practice: private, public and academic.

ASLA is the only organization which represents landscape architects in the United States. It is a voluntary professional society which has grown from 11 landscape architects on 1899 to over 7,500 members in 46 components nationwide in 1985.

TURF AND GARDEN FERTILIZER HANDBOOK

From: Donald N Collins
The Fertilizer Institute
1015 18th Street NW
Washington DC 20036

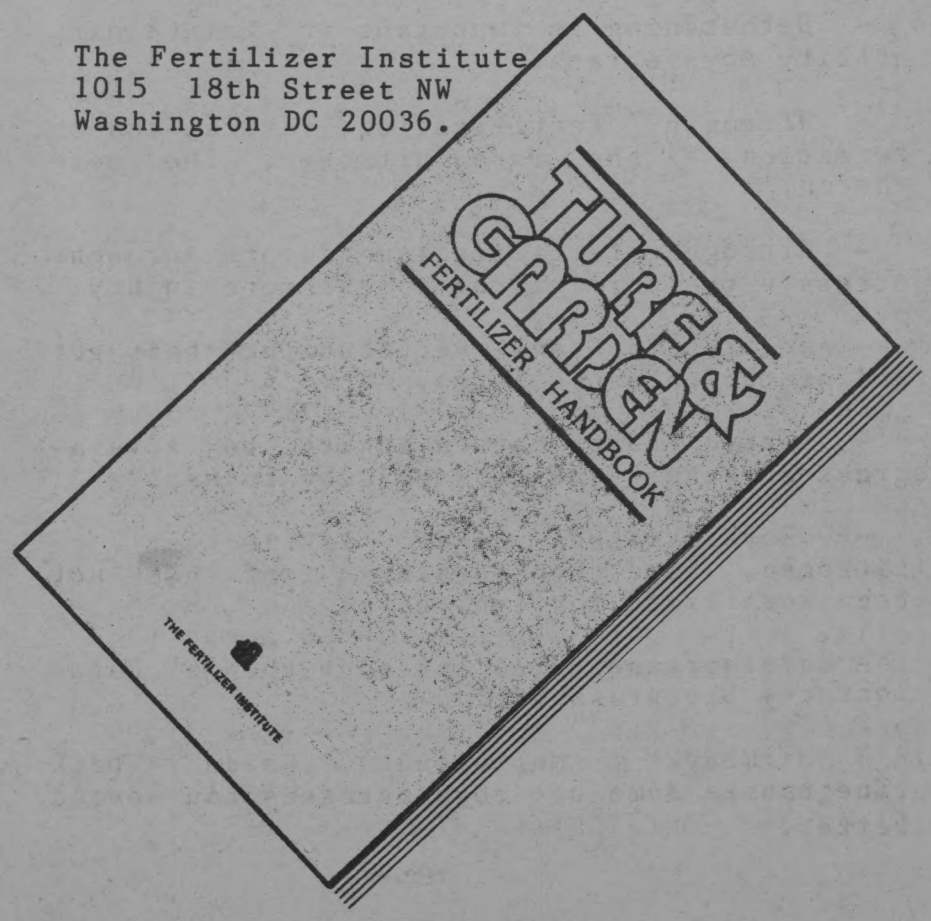
The objective of this new 126-page book, a project of the Institute's Turf and Garden Committee, is to help answer the day-to-day questions received from consumers. You'll find a comprehensive listing of fertilizer terms and definitions, explanations of plant nutrient needs of lawn grasses, garden vegetables and ornamentals, tips on lawn care, care of shrubs and trees and more.

The chapter authors in this new publication are well-recognized authorities in areas of horticulture, agronomy and fertilizers, such as:

- W H Daniel and R P Freeborg.
  The Need of Plants for Nutrients
- J R Hall III.
  Knowing and Correcting Soil Problems
- J C Harper II. Lawn Care
- F P Miller.
  Fertilizers and Environment - Living with Nature.

Copies of this valuable reference are available for $4.00 each from:

The Fertilizer Institute
1015 18th Street NW
Washington DC 20036.

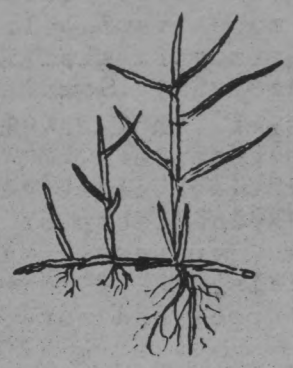


Conference Topics

Warvests 6

TWENTY-FOURTH ANNUAL MISSOURI LAWN AND TURF CONFERENCE

ST LOUIS
NOVEMBER 1984



ZOYSIA RESEARCH IN THE MISSISSIPPI VALLEY

Dr Herb Portz

Southern Illinois University
Carbondale, Illinois

Research on zoysiagrasses is not new in the United States. Continuing effort to understand how to make best use of this turfgrass of tremendous potential for southern and transition belt lawns is of interest. Dr Herb Portz of Southern Illinois University has outlined the following points.

- Meyer zoysia has been most extensively researched.

- Less problem with spring injury has been correlated with lower clipping heights.

- Dethatching is important in maintaining quality zoysiagrass.

- Nitrogen fertilization favors thatch formation - the more nitrogen, the more thatch.

- Nitrogen fertilization favors drought stress - the more nitrogen, the more injury.

- Aerification and verticutting help get rid of thatch as it forms.

- Verticutting causes injury to zoysiagrasses because they are so slow to heal.

- Zoysiagrasses need little or no nitrogen. Some good quality turf has not been fertilized for ten years.

- Zoysiagrasses will spread within a Baron Kentucky bluegrass turf.

- Embark (Mefluidide) holds back bluegrasses some so zoysiagrasses can spread better.

- Dr Wilkinson, University of Illinois pathologist has studied zoysia patch disease. No positive identification has been made. It is not a Rhizoctonia brown patch. Often see this in the spring following excess moisture. May occur in the same area year after year. Research is underway to determine climate, cultural and chemical aspects of the disease. Cause and control measures are not understood.

- Uses of zoysiagrasses are of interest. In Japan, zoysia is used on golf course fairways, tees and even greens. It is established from both seed and vegetative starts.

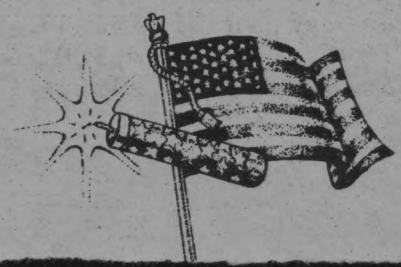
- Zoysiagrass seed is normally about 3 mm in length. Following scarification, it is about 2 mm in length. Decoated seed is about 1.5 mm in length.

- Zoysiagrass seed normally germinates -

5 to 10 % in 10 - 15 days
30 % in 6 weeks.

- Potassium hydroxide treated seed will germinate up to 90 % when soaked for 25 minutes in a 30 % solution and given a light treatment of 3,000 to 15,000 Lux for 36 to 48 hours. (Sunlight is about 6,000 Lux).

- A Brillion seeder used to spread seed at one half to one and one half pounds per 1,000 square feet has produced 90 % ground cover in 12 weeks at Carbondale, Illinois. Complete establishment is usually attained in 14 weeks with potassium hydroxide and light treated seed.



Conference Topics CONTINUED

ZOYSIA RESEARCH IN THE MISSISSIPPI VALLEY **Continued**

- The physiology of seed germination has been studied by Dr Portz. He has found that -

  - Zoysiagrass seed treated with potassium hydroxide and light has a 70 - 90 % germination in seven days.

  - Red light is the important wave length in sunlight. This is part of the normal band in sunlight.

  - A phytochrome system is evident in the seed.

  - Growth regulators are thus promoted that start germination. Otherwise, inhibitors prevent germination and continued seed dormancy results.

  - Seed coat, visible light, red light and temperature affect germination. They affect the embryo.

  - Endosperms contain protein, amino acids, starch, sugar, fat, fatty acids. These substances are needed for germination and subsequent growth.

  - A scarified seed coat must be rendered first. Then, red light to germinate or far red light to remain dormant will have an effect.

  - Seed stored under dry and cool conditions will remain viable for long periods of time.

  - Sodium hydroxide solutions [7.5 Normal] may be used to soak seed for twenty to thirty minutes with a resulting 85 % germination in eleven to nineteen days. Fatty material on the seed coat must breakdown to let light in. The sodium hydroxide makes holes in the seed coat and clears out the wax. When this is accomplished, light and water may penetrate. This same process takes place with potassium hydroxide solutions.

- Seed production is not believed to be a problem with zoysiagrasses. Seed can be obtained from Meyer and Midwest zoysia, but little is being used. Seed will germinate, if treated. There is more variability in seed harvested from Meyer zoysia than in that harvested from Midwest zoysia. Some plants have been selected as good seed producers. Others are very poor. USDA selections are being screened for seed production and compared with Korean common zoysia.

- Rust has become a limiting factor in some seeded zoysia turf.

- Breeding of zoysia at USDA in Beltsville and at Texas Agricultural Experiment Station in Dallas is expected to yield many new selections. These should be seeded types and serve as the breeding stock for cultivars of the future.

- Early establishment techniques have been researched. These have involved:

  - early spring treatment with glyphosate for weed control;

  - treatments with Tupersan and Siduron;

  - use of plastic covers;

  - seeding with as little as one quarter pound of seed per 1,000 square feet.

Covers help make the soil warmer and keep moisture in. From an April 28 seeding, a satisfactory stand has been obtained in nine weeks. Verticutting of seed into the soil has been beneficial.

Mowing of zoysia is an important practice, particularly for Korean common. From one half inch to one and one half inch cuts are employed.

Fertilizer is needed for establishment of zoysia. Three pounds of urea nitrogen the first year gave good results. Five pounds of ureaform nitrogen was required for the same degree of density. Verticle growth is not wanted, just increased density of stand.

- Zoysia grasses are frequently established by use of plugs and sprigs. In these instances, roots are slow to peg. Better rooting takes place where there is more light. Sprigs are harvested with a verticut and may be hydrosprigged with mulch as needed. The amount of mulch should be restricted so as not to exclude light.

UPDATE ON TURFGRASS CULTIVARS

Dr Jerry Pepin

Pickseed West
Tangent, Oregon

Lawns and turf can never be better than the genetic potential that the grasses allow. New cultivars are thus the basis for improved turf quality. Dr Jerry Pepin, Research Director for Pickseed West, provides the following update on turfgrass cultivars.

- There are about 500,000 acres in the Willamette Valley of Oregon. Half of this land is farmed for production of turf seed.

- In the 1960s and early 1970s, Kentucky bluegrasses received most attention. Natural or common types included Park, Newport, Delta and South Dakota common. The first of the improved types were Merion, Fylking and Pennstar. These were followed by a new hybrid, Adelphi, and Touchdown, Merit, Baron and Victor. Good shade tolerant bluegrasses, Nugget, A-34, Glade and Bristol became popular.

- New bluegrasses have potential for marked variation in color - from light green to dark green. Exceptionally dark green grasses stand out in turf that is mostly composed of light green types. Pure stands are especially attractive.

- Resistance for stripe smut has been improved in new bluegrass. Now, leaf spot and stripe smut are of less concern than they used to be.

- Fusarium blight and rust are much less damaging in new bluegrasses than they were in older varieties.

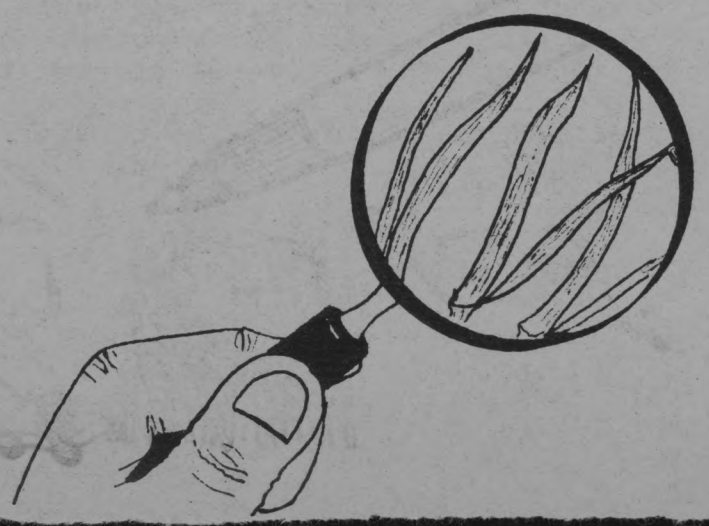
- New perennial ryegrasses have been developed that are excellent for lawn and sports turf. The old type ryegrasses, like Lynn, have been greatly improved. As recent as the late 1960s, no turf type perennial ryegrasse were produced. The 1984 crop should total close to 40,000,000 pounds of seed.

- New perennial ryegrasses are being used to overseed athletic fields, and golf greens in southern states. They are finding wide use for home lawns. Rapid establishment of uniform stands are important assets of these grasses.

- Tall fescues have been recognized by undesirable, coarse textured leaves of lighter color. New turf type tall fescues have finer leaves and darker color. In addition, they take lower mowing, have improved resistance to brown patch and Pythium and are better sod formers. High seeding rates and/or use of netting help speed up the development of marketable sod.

- Turf type tall fescues have good heat and drought tolerance and excellent wear resistance once established. They are a little slower to establish than perennial ryegrasses. They require less fertilizer to maintain reasonable quality turf. Color retention is good under drought. Shade tolerance is noteworthy, and they adapt well to diverse soil conditions without producing thatch.

- Some disadvantages of turf type tall fescues are being researched and efforts made to find better types. These include: finer leaf texture, more tolerance to clipping; better compatibility in mixtures with other grasses; better winter color under low soil fertility; still better resistance to brown patch and Pythium.



Conference Topics CONTINUED

UPDATE ON TURFGRASS CULTIVARS **Continued**

- Current recommendations stress mixing turf type tall fescues only with non aggressive bluegrasses. Best quality turf results from pure seedings.

- Turf type tall fescue seed production is within the range of 10 to 11 million pounds a year. About 50 % growth is realized each year and thus 15 to 16 million pounds of seed should be available next year. Seed supply may fall short of demand in the months ahead.

- Fine fescues include creeping, Chewings, sheep and hard types. Jamestown, Highlight and Shadow have become well recognized.

- Creeping fescues do spread some. Hard fescues have more heat and drought tolerance. Reliant, Araura and Spartin look good. Sheep fescue is a clump grass that requires no fertilizer, irrigation or maintenance.

- Breeding new grasses for high maintenance has been a prime objective. Grasses that respond to fertilizer and water have been in great demand. Emphasis on developing new grasses that are responsive to cultural practices will continue, but now there will be more attention directed to developing grasses that will persist well under low maintenance.

- The bluegrass release rate has slowed down. The new crop of bluegrasses is now about ten years old and plant breeders find that they are difficult to improve upon.

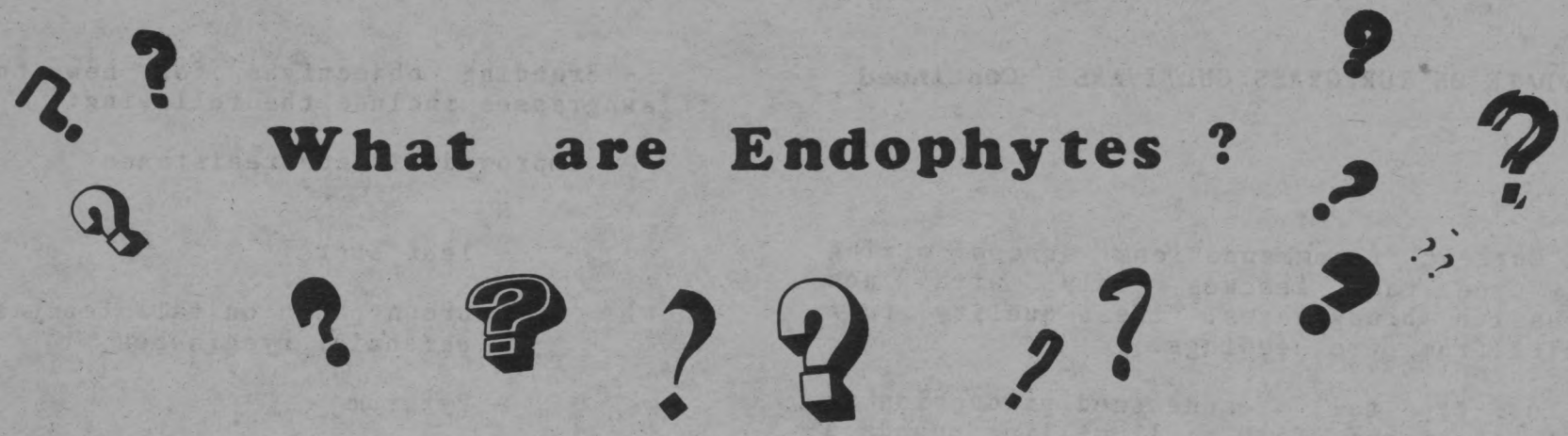
- Seed production research continues. In order to have reasonable prices at the marketplace, high seed yields are necessary. When increased cost of seed is compared with increased cost of other turf construction, maintenance and renovation products, seed cost increases have been modest. Such production factors as control of stem rust in the seed field could save five cents a pound that could be passed on to the consumer.

- Breeding objectives for new turf and lawngrasses include the following:

  - Improved disease resistance
    - leaf spot
    - brown patch on tall fescues and perennial ryegrasses
    - Pythium
  - Low maintenance - reduction in maintenance inputs.
  - Better perennial ryegrasses
    - less mowing from lower growing grasses
    - more heat tolerance
    - spreading growth habit
    - more insect resistance like All*Star and Repell - endophyte enhanced.
  - Improved herbicide tolerance of new grasses. Genetic engineering lends itself to this breeding objective.
  - Minimal maintenance grasses that are beautiful, desirable and functional.

Every day I love you
a little mower.

Conference Topics Continued



What are Endophytes ?

Dr David Sleper

University of Missouri
Columbia, Missouri

New information on endophytes has attracted attention in recent months. Both short term and long term value and positive and negative value are being discussed. Dr David Sleper of the University of Missouri lists the following points as important in answering the question, "What are endophytes ?"

- An endophyte is a plant within a plant. In the future, much will be learned about these relationships. In effect, they are fungus-grass connections.

- The fungus, Epichloe typhina (ET) can function as an endophyte.

- Choke disease results from a mass of mycelia going through the sexual stage.

- In ryegrasses and tall fescues the fungus does not go through the sexual stage in its life cycle.

- Sphacela typhina was identified as an endophyte in 1881. Now, Acremonium coenophialum has endophytic properties.

- Endophytes are known to create adverse effects in some animals.

  - "Ryegrass Staggers" and "Summer Syndrome" are believed caused by endophytes.

  - When sheep graze on endophyte infested forage, they get rough coats and muscle tremors.

  - Poor animal performance is often correlated with: elevated rectal temperature, failure to shed winter coat, uncomfortable feeling necessitating attempts to cool off by standing in water or rolling in mud, poor conception rates, low milk production, loss of weight, even death.

- Endophytes also have advantages they can depart to some plants:

  - insect resistance;
  - disease resistance;
  - enhanced heat tolerance;
  - enhanced drought tolerance;
  - improved persistence;
  - increased density;
  - faster recovery from injury;
  - more attractive appearance;
  - greater vigor;
  - reduced crabgrass invasion.

- Increased resistance to cutworms, armyworms and Argentine stem weevils has been confirmed. There is good evidence that other insects may be affected.

- Certain rusts have been noted to be less infectious in the presence of endophytes.

- Insect control may lead to other benefits on the basis of a more vigorous grass stand. Where there are mixed stands of grasses with and without endophytes, those with endophytes survive. This may be related to allelopathy in some instances.

- Dr Reed Funk of Rutgers University has noted sod webworm resistance in Pennant perennial ryegrass.

- Endophytes are seed born pathogens. Hyphae are found between the aleurone and endosperm layers. Under the seed coat is the aleurone layer then starch endosperm. The endophyte is usually found near the endosperm.

- Seed storage affects the viability of the endophyte. At 30-40 degrees F. it can be maintained for three to four years. When frozen, it can be held even longer. At ambient temperatures, the endophyte will last about one year. In the St Louis, Missouri area, seed stored in the garage for one year (high summer temperature and humidity) will only have about 20 % of the endophyte left.

Conference Topics CONTINUED

WHAT ARE ENDOPHYTES ? Continued

- Endophytes are transmitted to plants through the seed, not through the soil. As the seed germinates, the fungus grows. It can be found within the plant at about the four or five leaf stage.

- Endophytes do not penetrate living cells. They live in intercellular spaces - in sclerenchyma tissue. Thus, spread of the endophyte does not take place until this strengthening tissue develops. Thus, endophytes are not present in all plant parts and are never found in living cells. They do not develop as readily into root systems of tall fescue as into perennial ryegrass roots. They are found in the sheath more than in leaf blades. The mechanical packing of cells at the collar, where leaf blade joins the sheath, prevents endophyte movement into the blade. Some endophyte toxin may move independently of the fungus.

- All cool season grasses are suitable hosts for the endophyte. Some have more than others. Also, endophytes are present in trees and shrubs. The concept of endophyte enhanced insect resistance is being intensively researched.

- Endophytes are not likely to spread as they are confined to seed and mature plants through seedling development. Other possible mechanisms for spread are being investigated.

- Fungicides have little effect on endophytes. Some seed treatments may be effective, but little control is likely in a mature plant. State seed regulations now include endophyte testing under some conditions. A squash test can be used to indicate the presence of endophyte in the tissue but it will not tell if it is alive. Grow out tests and tissue culture studies are necessary for determination of live endophyte. These tests are time consuming and thus, costly.

LAWN INSTITUTE ELECTIONS

The annual meetings of The Lawn Institute were held in conjunction with the 102nd ASTA Convention in Nashville, Tennessee on June 25.

The Board of Directors elected the Executive Committee:

- PRESIDENT: Robert Peterson, E F Burlingham & Sons
- VICE PRESIDENT: Howard Schuler, Northrup King & Co
- SECRETARY/TREASURER: Robert Russell, J & L Adikes Inc
- MEMBERS: James Carnes, International Seeds

Doyle Jacklin, Jacklin Seed Company

Norman Rothwell, Rothwell Seeds Ltd.

NEW JERSEY TURFGRASS EXPO - 84

ATLANTIC CITY

DECEMBER 1984

Three nationally renowned plant pathologists contributed to the program of New Jersey Turfgrass Expo - 84: Dr Noel Jackson, University of Rhode Island; Dr Richard Smiley, Cornell University, and Dr Clint Hodges, Iowa State University. Their papers represent a noteworthy update on turfgrass diseases and their control.

Non-Target Effects of Fungicides

Dr Richard Smiley

Cornell University
Ithaca, New York

Dr Smiley is concerned about non-target effects of fungicides and lists the following points as worthy of consideration.

- Fungicides may influence soil: microflora, microfauna, macrofauna, chemistry and organic matter, such as thatch.

- Fungicides may influence plant: diseases, physiology and morphology.

- Fungicides may contaminate water and atmosphere.

- Non-target effects of fungicides include any effects other than those intended by the manufacturer when properly used. There is always a potential for pollution.

- Examples of non-target effects:

- Winter brown patch occurance where chemicals were used for snow mold control.

- Some fungicides are not effective on certain organisms so there might well be less red thread disease in the check that was not treated than where fungicides were used.

- Some fungicides have no effect on organisms causing leaf spot and may even increase disease incidence.

- Spilled fungicides may cause phytotoxicity.

- Poor regulation of fungicide application, such as might be caused by a mist blower, can result in phytotoxicity.

- Water soluble materials are likely to be more phytotoxic.

- Systemic fungicides have some growth regulation properties.

- Morphological effects include positive or negative changes in shoot density, root mass and leaf growth. These changes may be noted when higher rates than recommended are used or when repeat applications are made. Cultivar differences are noted.

- Physiological effects include changes in chlorophyll content, delay of senescence as a function of chlorophyll retention, and changes in nonstructural carbohydrate content.

- Bio assays of plugs from Fusarium blighted turf produced extracts of fungal origin that affected seedling growth. Seeds germinated but growth of seedlings was inhibited where Bayleton had been used. This could complicate overseeding of diseased turf treated with fungicide. This process can be reversed with gibberellic acid so the response must be a growth regulator effect.

- Repeated applications and/or high rates of fungicides bring on problems. Usually materials degrade in the soil. The half life of most chemicals ranges from one to fifty two weeks. Use of a variety of materials instead of just one, where possible, is good practice. Applications for control of diseases on Kentucky bluegrass may vary from three to nine. The fewer the better.

- More thatch development has been correlated with use of fungicides. These upset the balance between tissue production and tissue decomposition. Fungicide use results in more leaves, more roots, more thatch and greater sod strength. This increased production has to be decomposed. No relation between use of fungicides and numbers of earthworm casts above a thatched turf have been noted. Differences in fungicide effect on microorganisms have been observed. From fifty to two hundred and fifty percent control has been calculated.

Conference Topics CONTINUED

Cultural and Environmental Effects on Helminthosporium


Helminthosporium

Dr Clint Hodges

Iowa State University
Ames, Iowa

Research continues on Helminthosporium leaf spot. Dr Hodges, one of the world's leading authorities on these diseases, lists the following cultural and environmental points of interest.

- Bluegrasses have a fixed number of leaves per shoot. The youngest leaf is in the center and progressively older leaves are found down the shoot. This makes each leaf different because of age. The aging process in leaves changes their proneness to infection. The youngest leaves have less disease. More disease is found in the oldest leaves. This relationship holds for all varieties regardless of their resistance or susceptibility to disease. Most leaf spot is found in old leaves.

- Light has an effect on the severity of leaf spot disease. During long days, there is less disease on older leaves. Short days result in more disease on older leaves. Far red light causes more disease and promotes the aging process. Light is thus a controlling agent on the aging process and thus has an effect on disease.

- As carbohydrate (sugar content) drops, there is more likelihood of leaf spot disease. Again, a decrease in carbohydrate in the tissue causes other reactions that relate to aging. Fertilization with nitrogen causes sugar levels to drop in older leaves. A shift in sugar to the younger leaves stimulates growth, while older leaves are more prone to disease. Middle aged leaves are likely to have some more sugar and thus less disease. Next oldest leaves may have less sugar and thus more disease. Neither the oldest nor the youngest leaf are affected by change in sugar or disease. At these extremes, proneness to disease is fixed regardless of sugar levels. Thus, the nitrogen effect on disease depends on the age of the leaf.

- Herbicides affect disease. Materials like MCPP and Dicamba are auxin analogs and auxin hormones. They support development of young tissue and aging of older leaves. Use of an herbicide will cause greater disease incidence on older leaves.

- Are there more symptoms of disease in the fall ? If so, there are the following reasons:

  - Shorter days (ten hours) Top leaves are green while lower leaves age faster and become infected.

  - Light passing through a canopy of foliage gets more far red through. This increases aging.

  - Cloudy weather results in lower light intensity and increased aging of older leaves.

  - Fall fertilizer applications cause carbohydrate shifts - more disease in older leaves.

  - Fall herbicide use increases disease in older leaves.

- New ways must be found to control Helminthosporium leaf spot. It is not practical to try to control the fungus. A way to prevent yellowing (control for the symptoms) is needed. Turf research must become involved with the genetics of the aging processes. Physiology of these hormone processes must be better understood. There may well be a chemical that can stop or prevent the yellowing symptom. Until such a material is available, leaf spot and related yellowing of turf is difficult to stop or prevent.

Red Thread

A Disease on the Increase

Dr Noel Jackson

University of Rhode Island
Kingston, Rhode Island

Dr Jackson's update of the red thread disease situation featured the following points.

- Five years ago we thought we knew all there was to know about red thread. Not so !

- Turf of low vigor (similar to dollar spot) is susceptible especially fine fescues (red fescues more than Chewings fescues) and perennial ryegrasses. Bermudagrass is susceptible to pink patch too. Ryegrass cultivars differ in susceptibility.

- Recent evidence indicates that more than one fungus is involved. Corticium has been studied in detail, but there are at least two fungi involved - one causes red thread and one causes pink patch. The two diseases are similar and easily confused, one for the other. Often a disease complex - red thread/pink patch - are considered as one disease.

- Infection starts usually at leaf tips as small spots develop. These spread down the leaf. Fungi have pink mycelia that are easy to see. Cool, wet weather favors the development of the fungus. Compact masses of fungi produce a resting stage which gets darker red as it dries and becomes hard and brittle. Also, little cushions of mycelia are produced. There is a fruiting stage that produces two to four spores. These germinate to produce more mycelia. Turf grown under low fertility is more prone to infection but even vigorously growing turf can become infected. At times the fungus may act like snow mold under snow cover in the winter.

- The fungus may work on living tissue as a parasite or on dead tissue as a saprophyte. Some symptoms differ; patches may not produce dark red thread-like mycelia. more than one fungus may be working together at the same time under some conditions. The fungus glues or mats the leaves together so the pink appearance is more conspicuous.

- Pink patch fruits with only two spores. Mycelium is clamped and fluffs out in culture. Red thread produces less mycelia in culture and has a simple septa that is not clamped.

- Control of the two fungi with chemicals varies -

- cadmium good for both;
- daconil good for red thread;
- benomyl good for pink patch;
- bayleton good for both;
- chipco 26019 good for both.

THE FUSARIUM COMPLEX— NEW DATA

Dr Richard Smiley

Cornell University
Ithaca, New York

Dr Smiley's update on Fusarium blight patch diseases presents the following new concepts.

- Take-all patch (Ophiobolus patch) is circular, evolves and grows on the outer surfaces of roots and stolons, and is easily identified by its fruiting structures.

- Spring dead spot of bermudagrasses is caused by a complex of organisms. It forms a circular patch of dead grass.

- Fusarium blight syndrome is caused by at least two different fungi, perhaps more. Patches are formed that may affect large areas of grass. The blight is worsened by environmental stress that makes roots, rhizomes and crowns more susceptible to Fusarium. Stress plus the presence of the fungi create the disease.

- Now there are two new names:

  - first, summer patch;
  - second, necrotic ring spot.

Pathogens that cause these are closely related. They are soil born pathogens that do not attack the foliage. They infect rhizomes, stolons, crowns, and roots. These infections are followed by facultative parasites. They move into the plant to the vascular tissue where damage takes place through a clogging of the vessels. Small patches get larger, although some plants may remain alive by virtue of increased vigor. Patches come and go in response to environmental stress in the same general location year in and year out. With a heavy infection, individual patches merge to form large areas of dead and diseased turf.

- Summer patch often enlarges two to three inches a year and may not always look the same. It is caused by a fungus that works when temperatures are high.

- Necrotic ring patch is caused by a fungus with activity over a broader temperature range. It is the same as spring dead patch of bermudagrass. The patch pattern is of the frogeye type. Temperature and drought stress are necessary for the development of foliar symptoms, but roots may well be infected long before foliar symptoms are observed.

- Adelphi and Enmundi bluegrasses are tolerant of these diseases. All*Star and Derby perennial ryegrasses, Seaside creeping bentgrass and Falcon turf type tall fescue are resistant.

- Since these are disease complexes, chemical control measures are in need of further study. Tersan 1991 and Rubigon are recommended for both summer patch and necrotic ring spot. Chipco 26019 and Bayleton are good for summer patch alone. Overseeding with Adelphi and/or Enmundi bluegrasses or All*Star and/or Derby perennial ryegrasses will help create more resistance in the turf. Using turf type tall fescues to establish a new lawn of disease resistant turf is recommended practice. Further, changing cultural practices to help eliminate environmental stess is advised. Check the following:

  - lime to pH 6.5 to 7.0;
  - use balanced fertilizer;
  - adjust to more favorable mowing height;
  - restrict use of herbicides;
  - control irrigation carefully;
  - Check construction to be certain that soil and water relations are favorable and that unnecessary exposure to heat is reduced as much as possible.

Fusarium blight

ROOT PYTHIUM ON GOLF GREENS

Dr Clint Hodges

Iowa State University
Ames, Iowa

The news is that Pythium does not cause a root rot, but an induced disfunction. According to Dr Hodges, this knowledge makes a difference. The following points are important.

- Starting about 1977, case histories of a Pythium induced disfunction of roots of putting green grasses developed. The magnitude of this disfunction indicated some degree of seriousness. Was it a disease, or a disease complex ?

- Evidence pointed to trouble on high sand content greens. One to two years after renovation of greens, the condition developed. Where golf courses were renovated all over in late summer and early fall and greens were remade with high sand mixes, something changed.

- The following stress season brought about a dying out of the grass, much like foliar Pythium, but foliar pathogens could not be found. Roots were white and appeared healthy. Often, there was a chlorotic line at the interface between sand and soil at the edge of the green. Following this, grass starts to go from the center of the green. No chemical control has seemed effective. In some instances, the grass is all gone in ten days. No Pythium is present in foliar parts of the plant, but Pythium is present in the root system. In time, strips of sod or plugs are killed. Greens lost or damaged from this condition are usually reseeded in July and August. On the third and fourth year the condition becomes less severe.

- Tissue tests indicate that ninety eight percent of the isolates contain Pythium arrhenomanes [most common] and Pythium aristoporium [less common]. Pythium arrhenomanes is found all over the country and is particularly severe on very light soils.

- There are two categories of root infection:
  - seedling roots;
  - association between roots - mature.

Root systems are not rotted. They are white but stunted and full of Pythium. Organisms penetrate through root hairs. Cut the root and within two hours the Pythium grows out of the vascular system. Roots do not seem to be falling apart. Root tips are bulbous like might be expected from nematode activity; then Pythium grows out behind the area. Eventually a devitalized root tip is developed. This is the only form of rot, but since it is at the tip, it is of critical importance.

- In orchardgrass, the organism completes its life cycle. This does not happen in bentgrass. Apparently bentgrass is not a good host.

- Why is it that in recent years we have started to see this Pythium disease ? Can only speculate:

  - Leave old collar and apron in greens reconstruction. This consists of old contaminated soil.

  - Pythium exists in the old soil but is not troublesome because of competition with other organisms.

  - Sand in new greens is not highly organic. Pythium spreads through the sand in late fall and early spring.

  - When heat stress hits the following year, damage results.

  - In three to four years the sand becomes more active biologically and the problem is lessened.

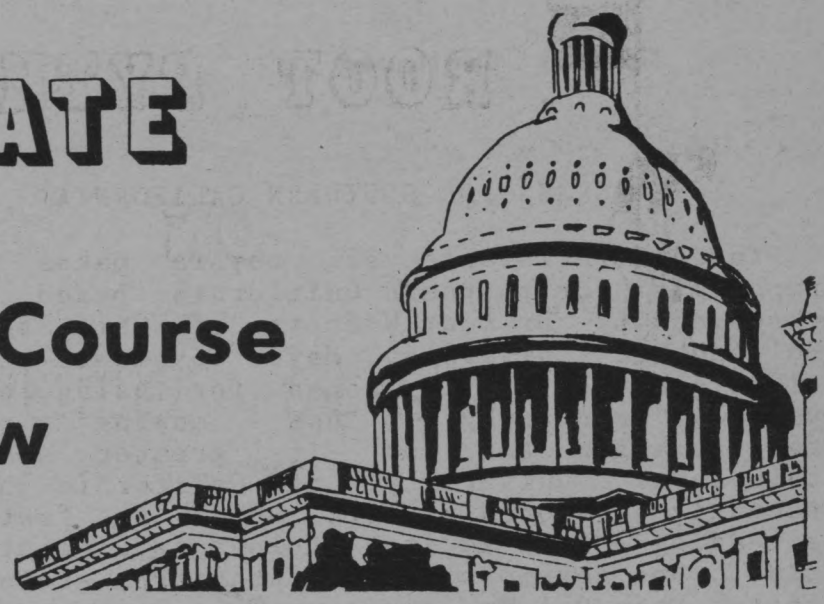
  - Pythium is a water mold so it would be expected to spread where heavy irrigation is practiced as on sand greens.

  - High fertility is likely to be a factor.

- Should use of sand greens be discontinued ? No ! Use sand, but be prepared. Watch for this condition where sand topdressing is used. Aerification and wetting agents help to lessen the severity of the condition. Look for the condition where sixty to one hundred percent sand is used in green construction.

- As a last resort, a plastic interface around the rim of the green may help as a barrier to the spread of the organism. Putting green design that eliminates a soil-sand interface at the outer most edge of the green, particularly at the soil surface is recommended.

RESEARCH UPDATE



56th International Golf Course Conference & Show

Washington, D.C.

The fifty-sixth Golf Course Superintendents Association of America Conference in Washington DC presented an opportunity for fifteen leading turfgrass scientists in the United States to update research in their areas of specialization. The following brief reviews highlight the significance of their findings. The value of this knowledge applied to turf management under practical conditions is worth millions of dollars. Turfgrass quality is better today because of accumulative research results through years past.

PERENNIAL POA ANNUA

Dr Donald B White of The University of Minnesota is developing Poa annua strains with desirable perennial growth characteristics. These include spreading by stolons (some 18 to 24 inches long), darker color, finer texture, improved density, deeper rooting, increased vigor, particularly during hot weather and propagation from seed. You can help Dr White by contacting him regarding perennial type Poa annua that you may have seen. It is wide spread and has the potential for making a new superior turfgrass.

CONTROL OF NORTHERN ORNAMENTAL INSECTS

Northern ornamental insects are the topic of research by Dr David G Nielsen of Ohio State University. Trees add much value to the landscape. The bronze birch borer causes thousands of birch to die from the top down each year. It attacks trees of declining vigor. The beetle works effectively on stressed trees. Manage the tree to improve vigor first - fertilizer in the fall; water in summer and fall. Then spray with Ficam, Turcam, Dycarb. Three applications are often necessary.

ZOYSIAGRASS FOR MISSOURI

Dr John H Dunn of The University of Missouri has researched the use of zoysiagrass under Missouri conditions.

Meyer zoysia has replaced U-3 bermudagrass on many golf tees and fairways. Nitrogen builds thatch and increases injury from drought stress. Six pounds of nitrogen per 1000 square feet per year is too much. Most thatch was found when the source of nitrogen was urea. Intermediate thatch was noted when IBDU was used. Least thatch was produced with ureaform fertilizer. Zoysia should be considered a true low maintenance turf. Aerify in June and July and use not more than two pounds of nitrogen per 1000 square feet. Combination of aerification and verticutting reduced thatch 25 to 30 percent. Zoysia responds well to close mowing.

INSECTICIDE MOVEMENT IN TURF THATCH AND SOIL

According to Dr David G Nielsen of Ohio State University, effective insect control depends on insecticide movement. In order to control Japanese beetle larvae, the chemical must move to the zone of soil infestation. Thatch may interfere with the downward movement of some insecticides especially when it's more than one half inch thick. One quarter to one inch of water helps wash the chemical down for more effective control. Mocap and Oftanol work well.

Conference Topics Continued

GCSAA Continued

ZOYSIAGRASS FOR SOUTHERN CALIFORNIA

Drought resistance of zoysia makes it important for southern California, based on research by Dr Kent W Kurtz of Cal State Polytechnic University. Meyer zoysia is the old standby. It is noted for using less water, requiring less mowing and fertilization and for its greater shade tolerance. University of California has recently developed El Toro which is faster spreading - 8 to 10 inch stolons in 2 months time. Sod develops in 5 months from stolons rather than 9 from plugs. The El Toro has improved winter color. New playgrounds and sports fields are likely to be planted to zoysia in regions comparable to southern California.

SOUTHERN ORNAMENTAL INSECTS

Southern ornamental insects are now controlled better with new insecticides researched by Dr Donald E Short of The University of Florida. Dycarb has a wide range of uses on ornamental plants. Turcam is used for the interiorscape. Avid represents a new class of insecticide that works on mites. It is active both within and outside the leaf. Zectran is effective on caterpillars and also kills slugs and snails. Insecticidal soap is still of value for control of interiorscape insects. Mavrik is effective both for landscapes and interiorscapes. Oxamyl is a systemic for use on flowering plants. It lasts 8 weeks or so outside and 12 weeks inside. Mole crickets can be flushed up to the surface with dishwashing soap in water. Ninety to one hundred percent control has been obtained where holes were spot treated with soap suds. Oftanol is the most effective insecticide. Two to three crickets per square foot indicate time to treat. It is not possible to eradicate insects - only control their development.

MAXIMIZING WATER INTAKE

Dr James B Beard of Texas A and M University has related rooting potential to maximum water intake. Maximum capability of turfgrass to take up water is only one aspect of drought resistance. Bermudagrass, adalaydgrass, zoysiagrass, centipedegrass, bahiagrass, buffalograss and St Augustinegrass have been evaluated for maximum rooting. Bermudagrass and St Augustinegrass produce the most roots. Centipedegrass, Meyer zoysia and Texoka buffalograss developed poorest roots. Differences exist within and between species. Above ground parameters are being evaluated for use in predicting root development within the soil.

CORING OR SHATTER CORING

Coring and shatter coring are not greatly different based on research by Dr Paul E Rieke of Michigan State University. Shatter coring is accomplished with solid tines. Coring is done with hollow tines. Core cultivation produces some soil compaction at the bottom of the hole. Continued cultivation at the same depth is likely to produce a compacted layer at this depth. The shatter tine works better on dry soil. It does not have the same value on wet soil. When all data is considered, there is little difference between the two based on the first years results. Both loosen the soil; both compact soil at the bottom of the hole; wet soil becomes more compacted.

CREEPING BENTGRASS TISSUE CULTURE

Dr Jeffrey V Krans of Mississippi State University is conducting tissue culture research on creeping bentgrass. Each cell from a seedling plant has the possibility of producing another entire plant. Working with hundreds of thousands of potential plants is possible through the culture of callus tissue. One small laboratory container may represent the equivalent of ten acres of plants in the field. Selection presssure which comes about slowly under field conditions can be brought about quickly in the laboratory. Selections are being made for heat tolerance, herbicide tolerance, toxin (such as might be produced by insects or fungi) tolerance. As cells with these tolerances are identified, the media is manipulated so as to develop whole plants from these cells. These plants are being used in conventional plant breeding to develop an improved creeping bentgrass.

Conference Topics Continued

GCSAA Continued

PATCH DISEASES OF TURF

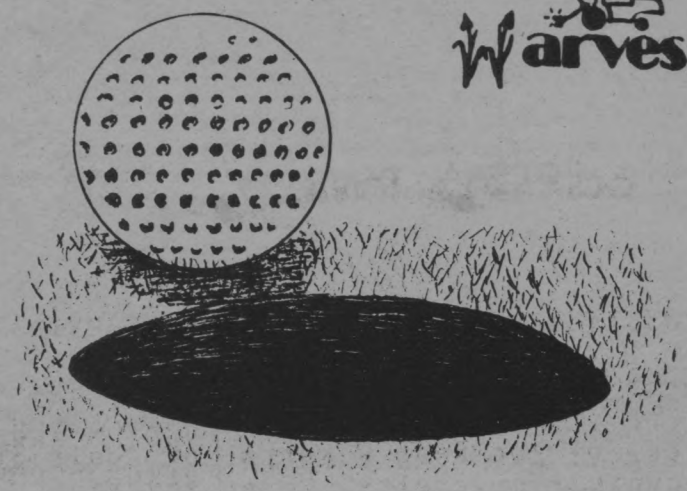
Dr Joseph M Vargas of Michigan State University reports new information on three patch diseases. Summer patch, necrotic ring spot and take all patch are all similar but caused by one or more of three organisms. They produce runner hyphae on roots but do not sporulate in culture. Summer patch occurs July through September on Kentucky and annual bluegrass. A chlorotic or bronze spot develops. Several may bleed together. Cultivar differences are noted. First it looks like wilting, then dead brown spots develop followed by a frog eye appearance with live grass in the center. Phialophora graminicola has been isolated. Perennial ryegrasses are resistant; red fesuces are susceptible. Rubigan, Tersan 1991, Fungo 50 and Cleary 3336 provide control.

Take all patch is especially damaging on bentgrasses. Annual bluegrass moves back in. Gaeumannomyces graminis is lessened in severity under acid soils high in phosphorus. No effective chemical control is available.

Necrotic ring spot, Leptosphaera korrae is seen from September through November and from March through May on Kentucky bluegrass. It may attack individual strips of sod in newly planted turf. Frog eyes develop and patches spread with time. A red cast develops on leaf blades. Rubigan provides some measure of control.

PUTTING GREEN SPEED

Dr Joseph M Duich and Steven R Langlois of Pennsylvania State University suggest that speed management of putting greens is of concern. It is important to know the effect of golf green management on speed. Lower clipping heights increase speed. Least density of turf is noted at a 3/32 inch cut. Best density occurs at 6/32 inch cut. Lower clipping also reduces root development. Temperature stress [wilting] causes greens to be a little faster. Watering slows them down. One third of an inch of water per day applied at noon is close to ideal. Mechanical rolling increases speed but the effect doesn't last long. Verticutting prior to mowing increases speed. Brushing does not. Of all management practices that increase speed, verticutting is recommended.



POA ANNUA

Apathy concerning Poa annua is a major problem according to Dr Roy Goss of Washington State University. No really serious attempt is made to control this weed in many instances. In fact, fairway renovation works; green renovation can work too. First, the best cultural practices for the turf must be in place. There is no use in trying any chemical control methods unless growth conditions are favorable for the basic grass. With a weed that goes from seed to seed in 45 days there is a lot that favors its persistance. Some annual bluegrass [Reptans] is more perennial in nature and often highly stoloniferous [18 inch growth in 3 weeks]. Even with this kind of variability in the annual bluegrass, the following management practices favor bentgrass:

- moderate nitrogen
- low phosphorus
- high potassium
- high sulfur
- acid soil pH
- minimum irrigation
- effective disease control.

Endothal, Ethofumesate, Rubigan, plant growth regulators and Glyphosate are all used in programs for annual bluegrass control. Fertilize one week before use of Endothal with 3/4 pound of nitrogen per 1000 square feet. Use 1/4 pound of active ingredient per acre. Repeat the treatment 3 times. Up to 1 pound of active ingredient per acre has been used in a single application. Bentgrass is overseeded. Throughout fairway renovation play should continue. A dye may be used to mask the injury where annual bluegrass is going out.

Ethofumesate has potential on ryegrass; fine fesuces are injured.

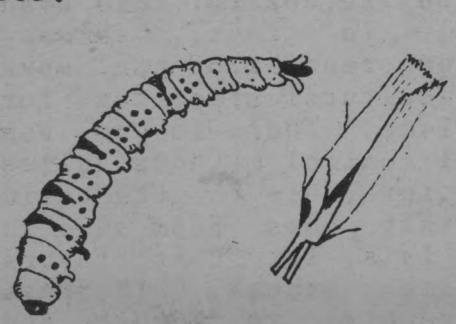
Bensulide, Benefin, Oxadiazon, DCPA, Simazine, Atrazine, Paraquat and Glyphosate are used for annual bluegrass control in bermudagrass.

Conference Topics Continued

GCSAA Continued

SOUTHERN TURF INSECTS

Dr James A Reinert of Texas A and M University sees need for continuing concern for southern turf insects. Mole crickets are becoming more serious threats to high quality turf. Host resistance of bermudagrasses makes a difference. Parasites and preditors are a possibility. Even fifteen to twenty percent reduction in damage is worth striving for.

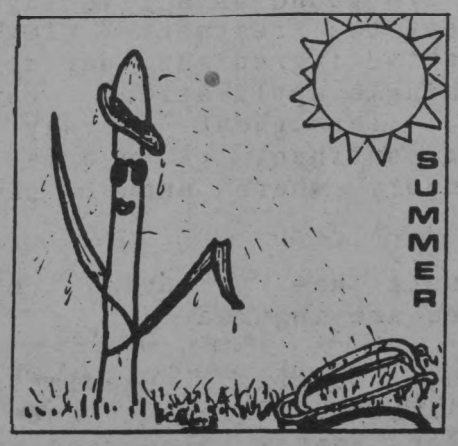


sod webworm

chinchbug

BREEDING OF SOUTHERN TURFGRASSES

Dr Milton C Engelke of Texas A and M University has proposed that because of increasing water use restrictions during the 1980s, new turfgrasses are needed for use with the quantity and quality of water available. We have been trying to modify the environment to match the cultivar. Now, we need to modify the cultivar more to match the environment. We have syringed the grass to cool it because it lacked heat tolerance. The new method would emphasize development of more heat tolerant grasses. Multiple characteristics must be dealt with. Genetics, physiology, soil physics and pathology need be considered. New grasses will come from existing zoysias, bents, St Augustines, tall fescues, buffalograsses and bermudas.



PLANT GROWTH REGULATORS AND POA ANNUA

Dr Robert C Shearman of The University of Nebraska reports plant growth regulators can be an important management tool to reduce mowing, slow verticle elongation of foliage and stop seed production. Embark R [mefluidide] stops seedhead formation, thus reducing a stress within the plant and allowing energy to be used for other purposes. Cutless R [flurprimidol] has a similar effect. Mefluidide applied September 8 at a rate of 0.13 pounds per acre left 85 to 100 % of the annual bluegrass. Treatments made November 8 at a rate of 0.38 pounds per acre left only 5 to 10 % annual bluegrass. These treatments did not affect Touchdown Kentucky bluegrass. As annual bluegrass is eliminated, turf may be overseeded effectively with perennial ryegrasses.

IRRIGATION SCHEDULING

According to Dr Robert N Carrow of The University of Georgia, the reduction of water use on turf requires careful irrigation scheduling. How is the "turn on" time and "turn off" time determined ? Experience, evaporation pans, tensiometers, infrared thermometry are all used. The latter reads the canopy temperature which is related to drought stress. On well watered turf, air temperature and canopy temperature are about the same. Under drought stress, the turf gets warmer. From temperature differences between air and canopy, stress degree days are calculated. When the total reaches perhaps 15, it is time to irrigate. With infrared thermometry indicator spots that wilt first can be checked first. Changes in management can help turf use water better. Soil, root and shoot influences are all important.

THRESHING THE JOURNALS

(Published research results)

INFLUENCE OF NITROGEN ON RECOVERY OF BERMUDAGRASS TREATED WITH HERBICIDES

B Jack Johnson 1984

Weed Science Vol 32 Number 6 819-823

Summer and winter weeds in bermudagrass can be controlled with postemergence herbicides. Turf injury is likely when chemicals are applied to actively growing grass. MSMA plus metribuzin or 2,4-D plus mecoprop plus dicamba cause injury to bermudagrass that recovers more rapidly when nitrogen is applied in sequence with the herbicide than when no nitrogen is applied. Results of research conducted at Experiment, Georgia have shown that herbicides applied at lower rates generally do not reduce density of Tifway bermudagrass. Time of nitrogen treatment was not as important in maintaining turf cover. But when turfgrasses were injured with higher herbicide rates, nitrogen treatment was necessary to obtain grass growth for recovery.

POTENTIAL FOR USING WEED SEED CONTENT IN THE SOIL TO PREDICT FUTURE WEED PROBLEMS

Robert G Wilson, Eric D Kerr and Lenis A Nelson 1985

Weed Science Vol 33 Number 2 171-175

Weed seed populations in the soil are variable. The type of seed present is closely associated with the history of the land. Land used for pasture will contain pasture weeds; land that is cultivated will contain cropland weeds.

Weed seed found in the soil does not germinate continuously but follows a cyclic pattern. Following soil cultivation or seedbed preparation for lawns, about 5 % of the total seed reservoir in the upper soil layer will produce seedling weeds. Weed seedling species composition varies with time of year and is closely associated with soil temperature, soil moisture and lawngrass competition.

Research at Scottsbluff, Nebraska was conducted on soil that had been under cultivation for 74 years. Crop rotation during the last 20 years was corn, fieldbeans and sugarbeets with alfalfa for 3 years interspersed within the rotaion about every 10 years. The soil was a sandy loam.

The total weed seed reservoir averaged about 250 seed per kilogram [2.2 pounds] of soil from the upper 15 centimeters [6 inches]. On the basis of one acre of soil to a 6 inch depth weighing 2,000,000 pounds, this would amount to about 228 million weed seed per acre or in excess of 5,000 per square foot of soil surface.

Nineteen species of weeds have been found in this soil. Those found most frequently were: redroot pigweed, common lambsquarters and common purslane. Seed from these weeds accounted for over 85 % of the total.

The following weed seed were identified in a fall 1980 sample.

WEED SPECIES	NUMBER OF WEED SEED/SAMPLE	NUMBER OF WEED SEED/ 1,000 SQ FT
Barnyardgrass	0.04	800
Brassica spp	2.00	40,000
Buffalobur	0.20	4,000
Common chickweed	0.04	800
Common lambsquarters	64.00	1,280,000
Common purslane	72.00	1,440,000
Common sunflower	0.30	6,000
Hairy nightshade	1.00	20,000
Kochia	2.00	40,000
Redroot pigweed	64.00	1,280,000
Russian thistle	0.20	4,000
Shepherds purse	9.00	180,000
Smooth groundcherry	4.00	80,000
Stinkgrass	4.00	80,000
Wild buckwheat	1.00	20,000
Yellow foxtail	6.00	120,000
	229.78	4.595,600

Editors Note: If this land were used for residential development or sold as topsoil for lawn establishment, it would contain close to two weed seeds for every lawngrass seed used in seeding a new lawn, based on a seeding rate of 2 pounds of Kentucky bluegrass per 1,000 square feet. If 5 % of these weed seeds germinate along with the lawngrass seed, there can be expected a weed population of close to 230,000 plants. Some of these will not tolerate lawn mowing but chickweed, pusrslane, shepherds purse and foxtail can be persistant in lawns and require use of herbicides for control.

Actually this cultivated farm soil may contain fewer weed seed than some sources of topsoil used for home lawns. Weeds in new lawns come from seed present in the soil; very few result from use of lawnseed that is contaminated with weed seed. High quality lawnseed is virtually free of weed seed.

DISTRIBUTION OF WEED SEED AMONG SOIL STRUCTURAL UNITS

Mario R Pareja, David W Staniforth and Gilda P Pareja 1985

Weed Science Vol 33 Number 2 182-189

Annual weeds depend on a prolific seed production for survival. Seed of many weed species mature or can enter a state of dormancy that assures an extended life span in the soil. Weed seed shed onto the soil surface may remain there to be incorporated into the profile by natural or artificial means. The fate of viable weed seed - germination, dormancy or loss of viability - is determined by internal physiological conditions and external environmental conditions imposed by the soil.

At the size scale of most seed, the microtopographic variability of the soil surface regulates seed germination and seedling establishment by creating a variety of microsites with different moisture/aeration conditions.

Research in Boone County, Iowa has been concerned with effects of conventional tillage and reduced tillage on depth distribution of weed seed and their location in relation to soil aggregates of different sizes. In spring samples, 85% of all weed seed in reduced tillage fields and 28% in conventional tillage were found in the top 5 centimeter [two inch] depth layer of soil. Conventional tillage incorporated weed seed uniformly into various soil aggregate classes. Reduced tillage caused more weed seed to be found in the unaggregated fraction of the soil. In fall samples, weed seed distribution in relation to soil depth and among soil aggregates was similar for both tillage regimes.

SEED-SOIL MICROSITE CHARACTERISTICS IN RELATION TO WEED SEED GERMINATION

Mario R Pareja and David W Staniforth 1985

Weed Science Vol 33 Number 2 190-195

The soil is heterogeneous, not only on the surface but also within the profile. Aggregated soils are composed of a well-aerated matrix of macropores and a variety of different-sized aggregates. Aggregates are cemented and microporous, retaining water during most of the year. Environmental conditions inside and among soil aggregates will differ, and this heterogeneity of the soil environment may have a significant effect on weed seed germination, dormancy and viability.

Weed seeds that remain in the soil for a period of years become associated with soil particles and are incorporated into soil structural units. Although the requirements for germination of all seed of a species is similar, the time at which these requirements are met in the soil may be different as dictated by the characteristics of the seed-soil associations.

Research at Iowa State University has demonstrated that new weed seed on the soil surface or in the macropore space of the soil, will be in a well-aerated environment and thus seed germination is a function of the moisture supply and the rate of evaporative water loss from the seed. Seed incorporated into soil structural units are exposed to high moisture and low oxygen levels which are more conducive to seed dormancy than to germination. The size of the aggregates and the rate of soil moisture loss will determine when and if these seeds germinate.

EFFECT OF TIMING OF SPRING APPLICATIONS OF HERBICIDES ON QUALITY OF BERMUDAGRASS

B Jack Johnson and Robert E Burns 1985

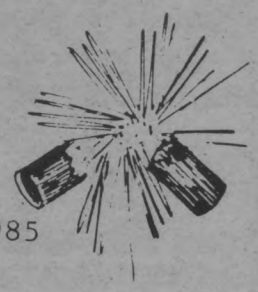
Weed Science Vol 33 Number 2 238-243

The use of herbicides for weed control in turfgrasses is a common practice for most turf managers. Time of application and herbicide selection are important for consistent weed control. Herbicides must control weeds without injuring the turf species.

Research conducted on Tifway bermudagrass at Experiment, Georgia has led to the following conclusions:

- Oxadiazon applied to dormant turf retarded early foliar growth more than other herbicides.
- Bensulide treatments that were delayed until after the grass initiated spring growth caused foliar growth and quality to be generally lower than when the treatments were applied to dormant turf.
- Retardation of early foliar turfgrass growth by 2,4-D plus mecoprop plus dicamba was generally the same whether applications were made to dormant or semidormant turf. This combination of herbicides reduced the quality and density of bermudagrass when applied to growing turf but not to dormant turf.
- Atrazine did not retard bermudagrass growth or affect density whether applied to dormant or semidormant turf, but turf quality was slightly lower when atrazine was applied to semidormant turf.

THRESHING THE JOURNALS CONTINUED



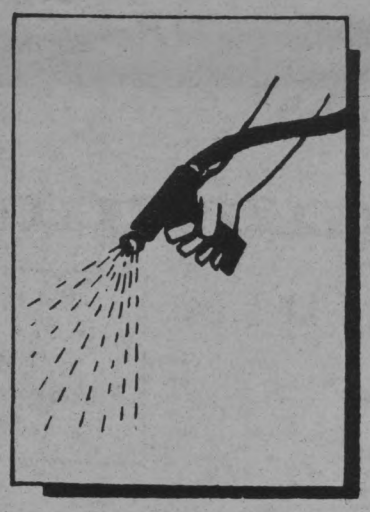
EFFECTS OF HERBICIDES ON BERMUDAGRASS SPRIG ESTABLISHMENT

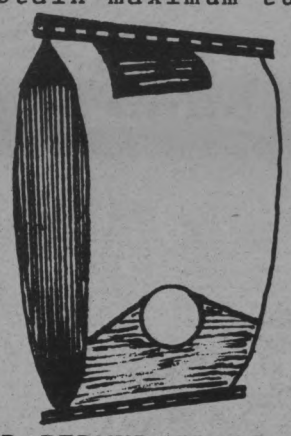
S Wayne Bingham and John R Hall III 1985

Weed Science Vol 33 Number 2 253-257

Goosegrass and crabgrass are particularly competitive with bermudagrass sprigs during the optimum establishment period of spring and early summer. Research conducted at Virginia Polytechnic Institute and State University has shown that bermudagrasses were tolerant of oxadiazon and MSMA used in controlling summer annual grasses during the establishment of sprigs. Metribuzin was too injurious to the developing roots for use during bermudagrass sprig establishment. Vamont, Midiron and Tifway bermudagrasses were included in the study.

At the end of this study in Experiment, Georgia, the quality of bermudagrass was higher in plots receiving sequential oxadiazon and 400 kilograms nitrogen per hectare [8 pounds nitrogen per 1,000 square feet] than in plots receiving any other herbicide with any other fertilizer rate of application. Even though there were differences in quality ratings among herbicide treatments, the quality of turf was reduced in all instances when less than 8 pounds of nitrogen per 1,000 square feet was applied regardless of herbicide used. Therefore, herbicides did not reduce fertility levels necessary to obtain maximum turf quality.





RESPONSE OF FOUR BERMUDAGRASS CULTIVARS TO DATES OF OXADIAZON TREATMENTS

B Jack Johnson 1985

Weed Science Vol 33 Number 3 371-375

Research at Experiment, Georgia on Tifway, Tifgreen, Tifdwarf and Ormond bermudagrasses involved use of oxadiazon. Treatments made in September at 4.5 kilograms active ingredient per hectare per year [4.0 pounds active ingredient per acre per year] reduced turf quality more than when treatments were made anytime from April through August. The quality of Tifway was reduced more than Tifgreen, Tifdwarf or Ormond. Ormond was reduced less in quality than the others, three weeks following treatment. Turf cover at the end of the growing season was not reduced with annual oxadiazon application at this rate. The cover of all plots was less when treatments involved 13.5 kilograms per hectare [12 pounds per acre] after four and five annual treatments. When compared with untreated plots, the cover of Tifway was reduced more from 12 pounds per acre of oxadiazon than any of the other cultivars. Bermudagrass growth is retarded the spring following use of oxadiazon the previous year.

EFFECT OF SOIL pH FERTILITY AND HERBICIDES ON WEED CONTROL AND QUALITY OF BERMUDAGRASS TURF.

B Jack Johnson and R E Burns 1985

Weed Science Vol 33 Number 3 366-370

Without proper fertilization turf growth may be inhibited by herbicide treatments, and weeds may again invade the turf area. Large crabgrass control was greater when either DCPA or napropamide was applied to common bermudagrass growing in soil of pH 5.0 than in soil of pH 6.4 during 2 of 3 years. Soil pH did not influence the response of large crabgrass to oxadiazon or benefin. Herbicides alone did not produce high quality turf unless fertilizer was applied annually at 300 kilograms nitrogen per hectare [6.0 pounds nitrogen per 1,000 square feet] or more. Bermudagrass quality was higher after three yearly applications of fertilizer at this rate when the soil pH was 5.0.

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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 interest and concerns.

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