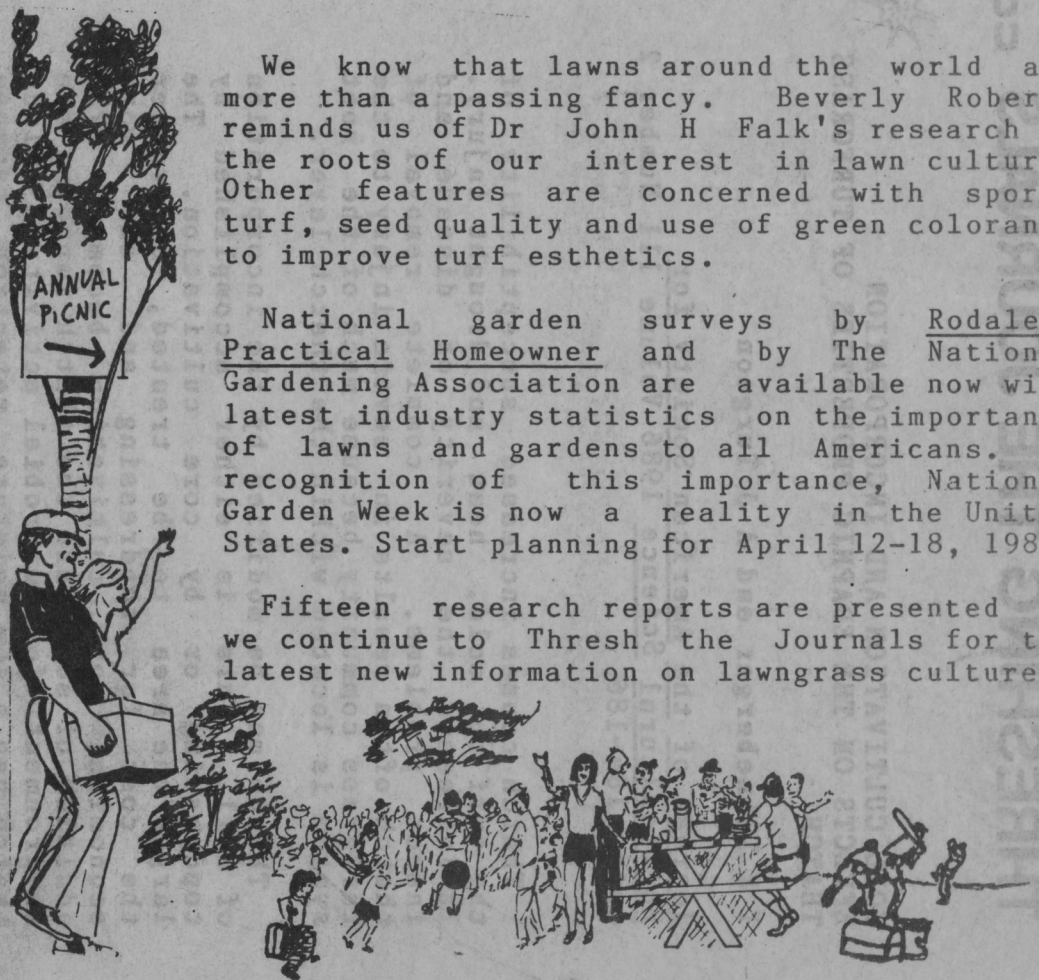
JULY 1986

LAWN INSTITUTE

Harvests

Volume 33 Number 2

THE HARVEST MIX



We know that lawns around the world are more than a passing fancy. Beverly Roberts reminds us of Dr John H Falk's research on the roots of our interest in lawn culture. Other features are concerned with sports turf, seed quality and use of green colorants to improve turf esthetics.

National garden surveys by Rodale's Practical Homeowner and by The National Gardening Association are available now with latest industry statistics on the importance of lawns and gardens to all Americans. In recognition of this importance, National Garden Week is now a reality in the United States. Start planning for April 12-18, 1987.

Fifteen research reports are presented as we continue to Thresh the Journals for the latest new information on lawngrass culture.

Lawn Institute Pitch

(Discussion of Current Issues)

arvests 1

The When, Where and Why of Lawns

by

Beverly C Roberts
The Lawn Institute

An article in the June 1986 Omni by Frank Kendig and Lisa Buck titled "Savanna Syndrome" caused me to dig through files to find "The Frenetic Life Forms that Flourish in Suburban Lawns" by John H Falk which appeared in Smithsonian April, 1977. Both articles refer to Dr Falk's studies of lawns throughout the world during the past 15 years. The research by Dr Falk is based on the energy that goes in and through the mini-eco-system of the lawn - the plants and the animals, including man. The Lawn Institute has been interested in the ecology of lawns since its inception thirty years ago.

When were lawns started ? Where are lawns found ? Why do humans exert such effort to create and maintain these areas of short mown grasses ?

Earliest man is thought to have come to being in the landscape of East Africa - an area of short grasses with scattered trees and bushes- the savanna. There is evidence that there were lawns in China five thousand years ago and that the Mayans and Aztecs had lawns. The designs of Persian carpets indicate grasses were manicured during the period of about 500 BC . Some of the designs show early gardens of intricate geometric designs with grass areas and walks between the flower beds.

During the Middle Ages open fields around castles provided a long range view giving warning of attacks by enemy lords. In the 13th century, the game of bowls was played on grass areas. Well-to-do people began putting short grass areas around their mansions and lawns became established symbols of prestige.

In the modern era,this tradition continued and immigrants to America created lawns around their homes and as centers of the settlements. Sheep and other animals were used to keep the grass short. Settlers found that some Indians used cropped grass areas for games, like lacrosse. In 1841 the development of the lawnmower started a new era for lawns.

Today, in the United States alone, there are an estimated 53 - 56 million home lawns amounting to 25 to 30 million acres. In New Jersey alone there are another 200,000 acres of turfgrasses on golf courses, cemeteries, parks, school grounds, airports, institutions, highways, etc. [An Economic Survey of New Jersey Turfgrass, Rutgers University.]

Dr Falk notes that during the history of this country, the land has been changed from its natural landscape of deciduous and coniferous forests and tallgrass prairies to a landscape that now resembles an East African savanna. Herds of wild animals graze the natural savannas and keep them mowed. Here, homeowners use modern mowing machines.

Here at The Lawn Institute we can attest to the devotion homeowners have for their lawns. Hundreds of letters come in with questions about new cultivars and maintenance practices. We agree with Dr Falk that "It [keeping areas of grass purposely short] could just have been a fad, but I've never heard of a fad lasting five thousand years." Dr Falk has speculated that lawns may be an attempt to create "neo-savannas", areas that resemble the original habitats of our species and are linked to our genetic survival mechanism. Whether this be the case, or that the care of living plants, including turfgrasses, is found to be pleasurable and therapeutic, lawn care in the 1980s is an increasing gardening activity with over 63 % of all U S households involved.[National Gardening Survey; Gardens for All, 1983-1984].

Conference Topics
(Presentations of note)

Harvests 2

FIFTY-FIRST ANNUAL IOWA TURFGRASS CONFERENCE

DES MOINES IOWA

JANUARY 1985

SOCCER FIELD MAINTENANCE

Larry Leuthold
Kansas State University
Manhattan, Kansas

In recent years, interest in soccer has increased across the country. A need for improved playing surfaces has led Extension Professor Larry Leuthold at Kansas State University to list the following points as important in the development and maintenance of soccer fields.

- There is no one special grass for soccer fields like there is for golf greens [bentgrass];

- Grasses used for soccer must be managed more intensively than where they are used for non-sports purposes;

- Athletic fields, in general, involve five types of specialized knowledge in order to be servicable. These are: design, construction, establishment, maintenance and renovation. Any one or more of these that are not technically up-to-date and accurate can cause failure of the turf;

- Without appropriate field design, construction specifications are easily flawed;

- Field construction must involve:

  * crowning and grading,

  * soil preparation,

  * drainage systems,

  * irrigation systems;

- Soccer fields should not have more than a one percent slope - maximum. Nine to 15 inch center crown on a field is about right;

- Drainage should occur to the sides of the field;

- Fields are often developed 100 to 130 yards long and 50 to 100 yards wide. Area covered varies from 1.03 to 2.69 acres;

- A total field management program is required. This involves: mowing, watering, fertilizing, weed control, insect control, disease control, aerification for compaction and traffic, topdressing, and renovation. Fields treated like hayfields are not good for soccer;

- Mowing involves attention to: height of cut, frequency of cut and type of mowing equipment used;

- Watering involves attention to: making applications of the right amount, seeing that rate of application is efficient, checking on uniformity of distribution, determining timing of applications including frequency and evaluating water quality as it affects turfgrass growth;

  * Fields should not be watered the day of the game;

  * Soil cultivation [coring] helps improve water penetration;

  * Water to a root zone depth;

Conference Topics CONTINUED

Soccer Field Maintenance continued

- Fertilizing involves attention to: kind of grass, amount of care intended, use of the turf, soil test information, new or well established turf, maintenance level: high-average-low;

  * In the midwest, fertilizer applications are appropriate in September, late October, April and June:

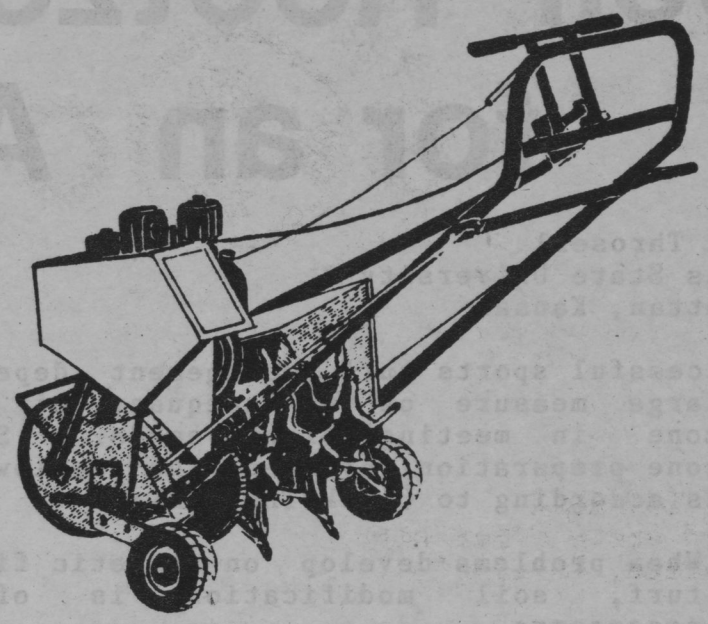
- Cultivation involves attention to: improving oxygen and carbon dioxide exchange in the soil, increasing water penetration, improving penetration of slow-to-move elements;

  * Core cultivation should consist of a minimum of 3 passes over the area, 5 passes would be better, each in a slightly different direction;

  * Core cultivate in the spring and in the fall with holes 3 inches deep using a 3/4 inch spoon spaced every 3 inches;

  * Soil moisture must be just right to get good penetration - not too wet and not too dry;

  * Core cultivation holes let oxygen in and carbon dioxide out of the soil;



- Spiking or slicing involves attention to: breaking up surface crust during the playing season and opening up the turf to control thatch formation;

- Traffic control involves attention to: use of practice fields. There should be no traffic within 24 hours after irrigation on playing surfaces;

- Weed control involves attention to: prevention of knotweed which comes in quickly as soils become compacted. Diseases and insects must be controlled to prevent weeds from taking over where turfgrasses are weakened;

- Renovation involves attention to: seeding new improved cultivars into established turf and seeding into dead turf that has been eliminated by use of glyphosate [Roundup®];

  * Eradication of weeds, thatch removal, cultivation, fertilizing, liming, seeding or planting sprigs and irrigation are all part of soccer field renovation;

- Topdressing involves attention to: leveling of the field to provide a smooth playing surface. Use soil the same as that in the root zone on the field or use pure sand.

Soil Rootzone Preparation for an Athletic Field

Clark Throsell
Kansas State University
Manhattan, Kansas

Successful sports turf management depends in large measure on the adequacy of the rootzone in meeting plant needs. Soil rootzone preparation involves the following points according to Clark Throsell:

- When problems develop on athletic field turf, soil modification is often necessary;

- Layers of soil in the rootzone interfere with favorable soil-water-air relationships and restrict the penetration of roots;

- Center areas of football fields where play is concentrated become worn and soils compacted. Soil modification is helpful in making turfgrasses more persistent;

- When problem areas appear, first identify the cause or causes and work backwards in correcting the conditions that contribute to turf failure;

- Look for the following conditions:
  * Soil compaction;
  * Poor surface drainage;
  * Poor internal drainage;
  * Rough uneven surface;
  * Soil layers through the rootzone
  * Worn turf;
  * Weed encrouchment in turf: knotweed, crabgrass;

- There are alternatives to soil modification:
  * Use practice fields more;
  * Cultivation - core aerification;
  * Verticutting and thinning the turf;
  * Installation of drainage lines;
  * Recrowning of the field surface;

- Consider partial vs complete soil modification. Evaluate the following:
  * Present rootzone soil type;
  * Existence of soil layers;
  * Adequacy of internal soil drainage;
  * Amount of field use;
  * Cost of partial or complete soil modification;

- Partial soil modification may be accomplished by adding sand and/or organic matter to the surface and then mixing this with existing soil to a prescribed depth. The amount added and the depth of mixing must be specified according to existing conditions. Also, drainage lines may be installed under areas where turf is at its worst, or under the whole field. These practices may involve trenching and placing medium sand above tile lines at the bottom. Sand may also be injected into slits or grooves cut lengthwise on the field [goal line to goal line]. The deeper the slits and grooves, the better. Excess water drains toward the side lines on properly crowned fields and is intercepted by these sand filled slits and grooves. Water is thus carried down away from the surface;

- Where sand is added to the existing soil, the end result should be 85 percent sand by volume. This amounts to 8 1/2 inches of sand for each 1 1/2 inches of existing soil. This is a lot of sand. In order to obtain uniform mixing, spread half the sand and cultivate it in 1 1/2 inches. Then, add the rest of the sand and incorporate that into the sand-soil mixture. All sand and soil must be mixed well;

Conference Topics CONTINUED

Soil Rootzine Preparation for an Athletic Field continued

- Sand consists of small solid pieces of quartz. While sand is solid, clay has small pores or spaces within each particle. When 40 percent sand by volume is mixed with 60 percent soil, the sand clogs up pore spaces and there is less water movement. When 70 percent sand is mixed with 30 percent soil, pore spaces are still clogged and there is less water movement. But 85 to 90 percent sand mixed with 10 to 15 percent soil causes the creation of sand bridges in the mixture that keep pore spaces open and result in more water movement. Ten to 15 percent soil helps provide for some exchange capacity and nutrient release. Too little sand can cause more harm than good. There is no way to cut corners on this;

- Sand particles vary in size as follows:

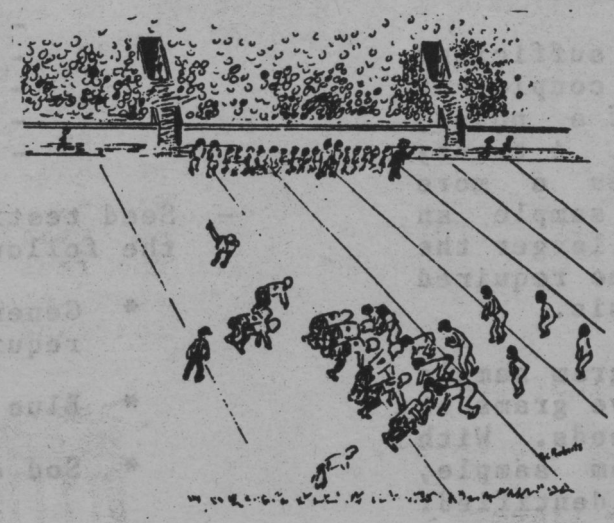
millimeters	USDA Standard Sieve Number
1.00 - 2.00	18
0.50 - 1.00	35
0.25 - 0.50	60
0.10 - 0.25	140
0.05 - 0.10	270

- Coarse sand sizes, such that 75 percent is within the 0.50 - 1.00 millimeter range [this will pass through a 35 sieve and stay on a 60 sieve], and fine sand sizes, such that 10 to 25 percent is within the 0.10 - 0.25 millimeter range [this will pass through a 140 sieve and stay on a 270 sieve], make a good sand for soil modification. A lot of very coarse sand or a lot of very fine sand should be avoided;

- Layers in athletic fields that have formed from previous top-dressing interfere with water movement in the rootzone. Additions of 5 to 15 percent by volume organic matter mixed with the top 5 inches of soil help improve this condition. Ten percent organic matter by volume amounts to 1/2 inch layer of material mixed with the top 5 inches of soil. Too much organic matter tends to create a muck type soil that holds too much water;

- Good sources of well decomposed organic matter include peats, peat humus, reed peat, sedge peat, peat moss, digested sewage sludge, manure, sawdust, bark, hulls. The correct particle size for incorporation is important. Avoid material with a lot of very fine particles. Undecomposed coarse material can become too wet and soggy. Particles between these two extremes are just starting to decompose and are about right. Cost is related to local availability. Salts in manure, heavy metals in sewage sludge and toxins in barks and sawdust must be watched for.

- Complete soil modification is more expensive than partial modification. Specifications are well established for the U S Golf Association method, the Prescription Athletic Turf [PAT] system and for all sand fields. In each case, specifications must be followed exactly. All involve high sand content with or without organic matter and some soil. Rootzone components must be carefully selected on the basis of test results. Materials are mixed off site on a volume basis. Drainage systems are a part of the total soil modification procedure. Only an entire field can be improved in this manner. Thus, costs are higher than for partial soil modification.



THIRTY-SIXTH ANNUAL CANADIAN TURFGRASS CONFERENCE AND SHOW

WINNIPEG MANITOBA CANADA
MARCH 1985

SURVIVAL OF THE FITTEST

Dale Kern
Seed Technology Inc
Marysville Ohio

Dale Kern reviewed the topics of importance as related to seed testing and emphasized the value of independent testing of lawn and sports turf seed. The following data was presented in support of seed testing programs:

- Certified Merion Kentucky bluegrass may have a tag that indicates:
  - * 98.43 % pure seed
  - * .16 % crop
  - * 1.41 % inert
  - * .00 % weeds
  - * 89 % germination
- Data on the tag is based on an analysis of one gram [one teaspoonful] of seed. This may represent a lot of seed sufficient to fill a freight car.
- Certain weeds are of sufficient importance that ten grams [a couple of tablespoonsful - about 1/45 of a pound] of seed is used for the test. A twenty five gram seed sample provides a more accurate test and a 250 gram sample an even more accurate test. The larger the sample tested, the more time required and the more costly the analysis.
- A weed seed test on a one gram sample may show no weeds. Twenty-five grams of the same seed may have two weeds. With a two hundred and fifty gram sample, fourteen weeds may be identified. Sufficient annual bluegrass seed may be present to account for 8 plants per 1000 square feet at standard seeding rates.
- The following twelve dicot weeds are troublesome:
  - buckhorn
  - black medic
  - common chickweed
  - clover
  - plantain
  - purslane
  - curley dock
  - dandelion
  - oxalis
  - chickory
  - ground ivy
  - mouse ear chickweed.
- The following twelve monocot weeds are troublesome:
  - red top
  - annual bluegrass
  - crabgrass
  - witchgrass
  - nimblewill
  - tall fescue
  - dallisgrass
  - foxtail barley
  - barnyard grass
  - goosegrass
  - timothy
  - quackgrass.
- Seed testing may be accomplished to meet the following requirements:
  - * General - federal and state requirements;
  - * Blue tag certification;
  - * Sod quality;
  - * Consumer specifications by independent tests.

Conference Topics CONTINUED

Survival of the Fittest continued

- Notes on seed testing:

  * Inert material can be evaluated by use of a blower that separates lighter seed pieces and dust from heavier seeds.

  * In the seedhead, the bottom 1/3 of the inflorescences are well developed. The mid 1/3 are moderately well developed and the top 1/3 are not so well developed. This means that seed size and weight will vary.

  * There may be double florets. Two to three seeds stick together with usually only one that is good. An inspection may show 4 to 5 percent doubles or up to 13 percent may be doubles. Based on tests, 13.1 % doubles is high and 0.6 % doubles is low. The more doubles, the less good seed. This may alter the value of the seed by 25 percent.

  * Numbers of seed per pound vary. In Kentucky bluegrass 1,112,658 is considered high; 825,774 is considered low. This amounts to a difference of 286,884 seeds or 37 percent variation. Pennfine perennial ryegrass may have 225,100 seeds per pound while Loretta has 410,327 seeds. This amounts to a 60 % difference.

  * Cost should be figured on the basis of numbers of seeds that will grow to produce plants. Dormancy of seed has an effect on this. A high dormancy percentage would be 64. Two percent dormant seed would be low. This amounts to a spread of 62 percent. Other seed may be physiologically immature. More attention should be directed in this area. The tetrazolium test is used to see if the embryo is alive - this is a good, fast method.

  * Bentgrass seed may lodge with a fescue seed and pass through the screen together causing contamination of the fescue. Patches of bentgrass in turf seeded with fescue blends and mixtures can become established in this way.

  * Ergotized seed may be noted in some instances. This ranges from non-infected to infected and causes seed to be substantially weakened. A better understanding of this fungus condition is needed.

- Only the fittest seed produce a turfgrass plant that will survive. Seed may be dead or alive, old or young, weak or strong and all combinations of these. Most lawn and sports turf seed will survive under ideal conditions, but will it survive when conditions are less than ideal ? Laboratory tests provide near ideal conditions for 28 days of seedling development. In the field, ideal conditions seldom last for 28 days. Laboratory methods do not yield data that is realistic for seed performance in the field. However, laboratory tests are the best measure available.

- Seed vigor by lot can be determined. For example, vigor ratings of 52, 63, 89 and 111 seed indicate 52 to be slow and weak in germination at 8 days, whereas 111 has high strong germination at 8 days. Strong plants fill in faster. These ratings can be interpreted in terms of low, medium and high performance. Some seed lots have a high percentage of one type and a low percentage of another. Others may have relatively equal proportions of all three types. Seventy pound seed [low performance] would require 13 seeds per square inch for establishment; 40 pound seed [medium performance] would require 7 seeds per square inch and 20 pound seed [high performance] 3.5 seeds per square inch. Thus, vigor and seed count work together to make a difference. Even so, 4 seeds per square inch of a vigorous seed is better than 14 seeds per square inch of a weak seed.

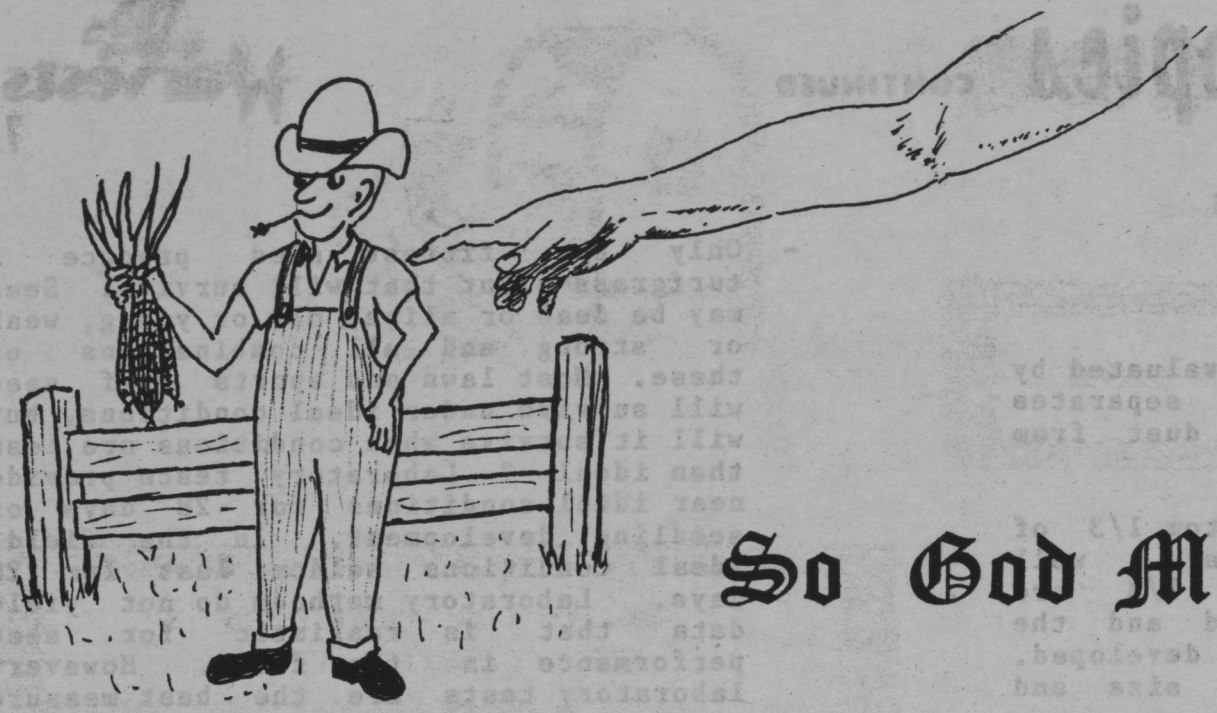
- Summary:

  * The following variation in seed of lawn and sports turf types is to be expected:

    - purity 3.7 % variation
    - germination 12 % variation
    - number of seeds 34 % variation
    - survival of seed 22 % variation.

  * Figure how many seeds per square inch are needed to develop the required number of grass plants. Then compare costs.

  * Seed tests can provide the information required to make best decisions on what to purchase.



So God Made a Farmer

Surveying the world He had made, God looked down one day and said, "I need somebody down there to be caretaker of my kingdom."

So God made a farmer.

"I need somebody who will sit up all night with a newborn colt, watch it die and be able to say, 'Maybe we'll get an even better one next year'."

So God made a farmer.

"I need somebody who can eat dirt, smell manure, listen for thundercaps, taste bugs in his teeth and still feel good all over."

So God made a farmer.

"I need somebody who can get up before dawn, milk cows, work in the field all day, milk cows again, eat supper and then go into town and stay there 'til 2 a.m. at a school board meeting."

So God made a farmer.

"I need somebody with arms strong enough to wrestle a big calf to give him shots but a heart gentle enough to cry when his first grandchild is born."

So God made a farmer.

"I need somebody who can call hogs, cuss at ornery, cantankerous old machinery, bark orders to the hired man and then come home and whisper to his wife that she's the same pretty girl he married 15 years ago."

So God made a farmer.

"I need somebody who can wait patiently for his afternoon lunch until his wife is done feeding all the ladies at her cosmetics party, and then tell them all to come back soon."

So God made a farmer.

"I need somebody who waits all year to harvest a crop, but will stop in mid-field and run to help when he sees smoke coming up from the neighbor's place."

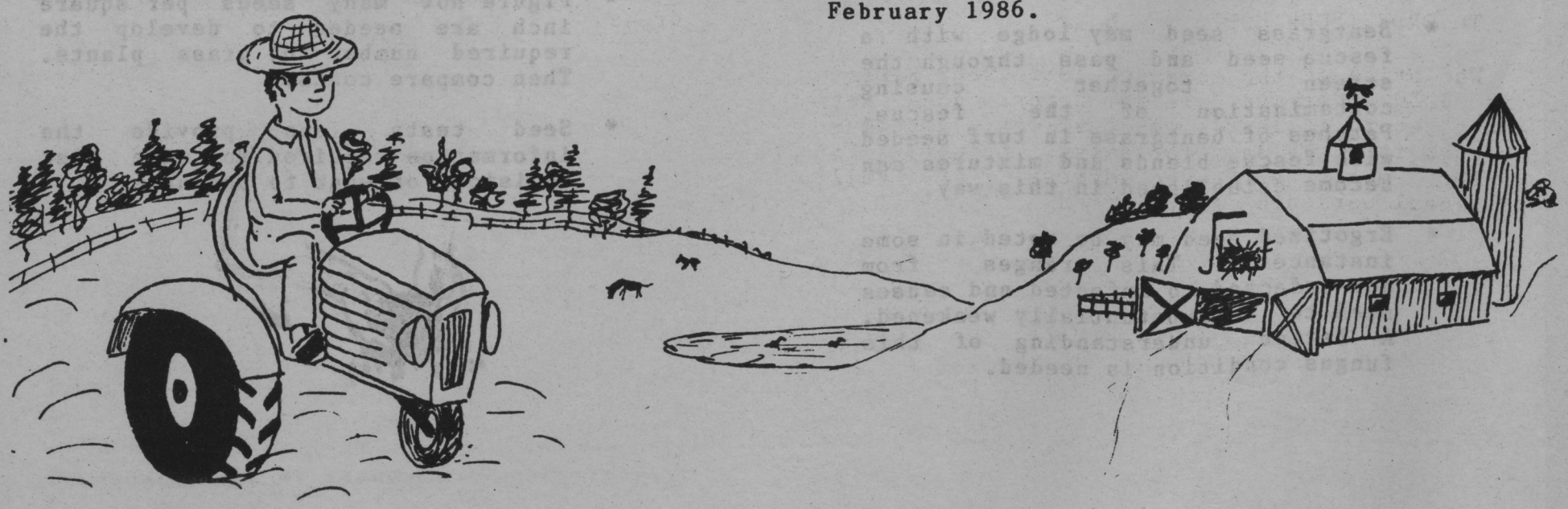
So God made a farmer.

"I need somebody who will smile, then laugh and then cry when his son says he wants to spend the rest of his life doing just what Dad does."

So God made a farmer.

- Column by Shirley Springer, Carpio, ND; McLean County Independent of Garrison, ND.

As quoted in "Tennessee Farm Bureau News" February 1986.



P.O.BOX 108

(Industry Wide News and Views)

1985-1986 NATIONAL GARDENING SURVEY

From: Charles Scott, President
National Gardening Association
180 Flynn Ave
Burlington, Vermont 05401

(802/863-1308)

The new 1985-1986 National Gardening Survey contains the most complete and current research on the consumer lawn and garden market in America. Conducted each year since 1973 by the Gallup Organization for the National Gardening Association, the Survey provides information on industry trends and market intelligence to executives in many lawn and gardening businesses.

All of the facts and figures have been compiled, cross-tabulated, analyzed and presented in a comprehensive 320 page report to help in your marketing and product decision making process.

In 1985, 84 percent of all U S households or 74 million households participated in one or more forms of indoor or outdoor lawn and garden activities. That compares with 71 million households in 1984, 69 million households in 1983 and 71 million households in 1982. Gardening was also the number one outdoor leisure activity in 1985. And the biggest news is that members of the baby boom generation are becoming important lawn and garden consumers. With all of the key economic and demographic indicators for continued growth of the lawn and garden industry looking positive, we hope your business is positioned to take advantage of the profitable years ahead. To make sure you are on track, we suggest that having a consumer information system like the National Gardening Survey is a basic key to success.

TO ORDER YOUR COPY...

The price of the expanded 1985-1986 Report is $250 postpaid. If the Report does not meet your fullest expectations, you may return it in 15 days for a full refund. To order, mail to above address, or call National Gardening Association.

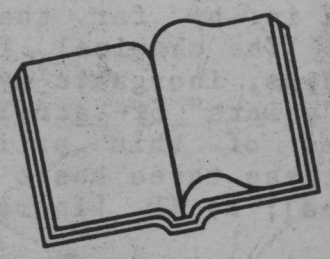
GROUNDS MANAGEMENT FORMS & JOB DESCRIPTION GUIDE

From: Allan Shulder
Professional Grounds Management Society
3701 Old Court Road Suite 15
Pikesville Maryland 21208

(301/653-2742)

The Professional Grounds Management Society is pleased to announce that a new manual has been published, Grounds Management Forms & Job Descriptions Guide, 1st Edition, 1986. This manual has 40 pages of black ink on white paper for easy reproduction. It contains sample contracts, forms for estimating, seasonal calendar recommendations, work orders, warranty and complaint forms, time sheets, and vehicle and equipment logs. There are personnel job descriptions with special categories, supervisor/manager, foreman/crew member, gardener/technician, and performance evaluations sheets.

The manual will be free to PGMS members and can be ordered by non-members for a cost of $9.00, if check is sent with order [or $12.00 if billed]. If ordered with either the Grounds Maintenance Estimating Guidelines or the Grounds Maintenance Management Guidelines, the cost for the two manuals will be $15.00 if check is sent with the order [$20.00 if billed]. If all three manuals are ordered, the cost is $22.50 with check [$30.00 if billed]. Send order to above address.



GREEN IS BEAUTIFUL

From: Bill Rhymes
Mallinchkrodt Inc
1007 Hidden Valley
Shelby, North Carolina 28150

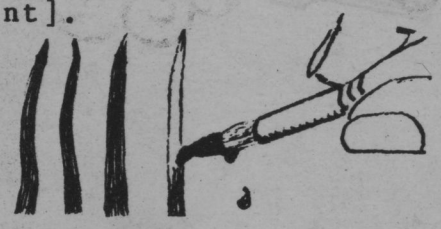
(704/482-6804)

The magnificient VICTORIA AND ALBERT MUSEUM in London, houses many of the world's finest authentic art objects and artifacts. However, it has one entire wing filled with reproductions - fake sculpture, statues, temple walls, columns, etc., all copies of the originals in other museums. While of interest, after one learns they are reproductions, they lose the appeal the real object would have. No one really likes a fake - right ? Wrong! We are surrounded by fakery everywhere. There is not a woman [and most men] alive who does not resort to a little fakery every day to improve personal appearance. Women use lipstick, powder, hair coloring, eye shadow, while men use lotions, hair tonics, shoulder padding in coats, etc - all to improve the real thing.

There continues to be a raging debate over fakes in the Ornamentals industry. We all know about and have seen artificial grass and flowers. Most folks do not like them. Who wants to walk or lie down on plastic grass or be in a restaurant or shopping mall surrounded by plastic plants ? Is there any place in the Turf and Ornamentals industry where a little fakery is acceptable by all? Yes, there is, in the use, at certain times, under certain conditions, of COLORANTS to enhance the beauty of the real thing.

The color of well managed growing grass, as well as most foliage plants and trees, is GREEN. This is the only color we will concern ourselves with here. We will examine several ways green colorants are used on grass and foliage plants. To simplify further, we will call these Green Colorants "GCs".

GCs are of several types, such as wettable powders, liquids used "as is", and concentrated flowables diluted with water. The last one is by far the most economical cost in use. The chemical formulations can be organic dyes, inorganic dyes and specially formulated "paints" of acrylic/latex types. For purposes of this article, we will designate these three basic types as: 1) OD [Organic Dyes]; 2) ID [Inorganic Dyes]; 3) P [paint].



Generally, ODs are very short-lived and are used primarily as spray indicators. They are not a natural green grass color, but that does not matter as they fade rapidly and have served their purpose. IDs are natural green color, last several days, and are excellent as a spray indicator or for touching up off-color turf. Ps are permanent, lasting several months and are non-staining when dry. All are formulated to be safe [non phytotoxic] to grass/plants and non-toxic to mammals - including man.

Probably the widest use of GCs is on dormant grass. For years, superintendents of major sports stadiums have used GCs to "paint" dormant or off-color turf. However, dormant turf is not the only candidate, as there is a growing use of GCs on actively growing grass.

The following is a list of several areas GCs are used on Turf:

1. Athletic Fields - Type P on dormant or off-color grass to give a natural, instant "Summertime" green color.

2. Golf Course Greens/Tees/Fairways - Type P used in place of overseeding certain areas. IDs used to touch up off-color and diseased areas and as spray indicator. OD used as spray pattern indicator.

3. Landscape Contractors - Type P on new sod jobs to give finished, natural look until sod is "pegged down" and growing.

4. Professional Lawn Care - Type P on dormant home and commercial lawns. ID to touch up diseased or damaged areas. OD as spray indicator.

5. Miscellaneous - Some odd but successful uses of type P have been reported, such as: [a] lake dye; [b] mixed with soil to replace divots [would be cheaper to fill divots with soil, then spot spray on top with type P; [c] Type P on sod sample prior to display at trade shows.

The use of GCs on Ornamentals is not as extensive as on turf, but nevertheless is growing. The P type is now extensively used on newly cut Christmas trees prior to shipment to give natural, uniform color where insect of disease may have caused unsightly areas. Landscapers are finding a light spray with P on some foliage plants gives a more uniform, finished look. Care must be exercised here, however, as too much can color branches or trunks green and create an unnatural appearance.

Green is Beautiful continued

Some points to consider in picking a GC are:

1. Pick right products for job intended. Do not use an OD, which fades rapidly, to color dormant turf. Conversely, do not use P as a spray indicator as it is permanent and will last for months.

2. Be careful using ID as tney stain. It only takes a pinch in spray mix as an indicator, so don't over use.

3. Study cost-in-use carefully when selecting P. There are several on the market that are low cost/gal, but you use that gallon "as is" or mixed with only 6 to 8 gallons of water. Also, they look artificial, with an unnatural color, on grass and ornamentals. The best one of the Ps is one slightly more expensive per gallon, but is mixed with up to 70 gallons of water. It is also the most natural looking green color and once dry, will not rub off on uniforms, clothing or equipment.

4. Do not be a do-it-yourselfer" and try just any green water-based paint. Some can be very phytotoxic to grass and plants. Use only those specially formulated to be safe to vegetation and humans.

5. Talk to other Superintendents, Growers, Stadium Managers, etc. They will be glad to tell of their experiences with GCs.

6. The products mentioned herein [P, ID, and OD] are well known to major Turf and Ornamental Product Distributors. They will be glad to suggest the right products for your application.

Nothing substitutes for a disease and insect free, well managed, natural growing plot of grass or ornamental plants. Alas, there are times when even the best manager has problems, or nature has taken its course and dormancy occurs. As mentioned earlier, women and men are not perfect and at times enhance their appearance with colorants. So, there is really no reason not to use GCs wisely at certain times to improve the appearance and enjoyment of Turf and Ornamentals. You may not reach perfection, but you can rest assured that you have "improved an image" a little and gained a lot.

AGRICULTURE COUNCIL OF AMERICA

From: Orville L Freeman
President & Chief Executive Officer
Agriculture Council of America
Suite 601
1250 I Street NW
Washington DC 20005

(202/682-9200)

The images commonly evoked by the word "agriculture" are diverse: grains, meat and dairy livestock, fruits and vegetables, cotton, wool, soybeans, the well-known crops. At best. Farmsteads, perhaps.

Nurseries and greenhouses, or vineyards ? Maybe. What about longshoremen ? Retail food-store clerks, or the cashier at the nearby fast-food spot ? Seed and feed stores ? Advertising account managers in agricultural marketing ? Meatpackers ? Veterinarians? Research scientists in a thousand different fields at the cutting edge of high technology ? Spice processors ? The multi-brand food companies ? The fashion industry, from designers and models to seamstresses and tailors ? Pulp and paper ? Beverages ? All forms of energy businesses ? Barges ?

As you know, one could keep going for hours. My point is that relatively few perceive "agriculture" as a team of 21 million men and women that - while it is undergoing persistent hard times - is alive, is producing enough for this nation and for ranking as the No 1 food and fiber exporter, is still the heart of our economy and, as a team, will pull out of this !

TEXAS LAWN CARE

From: T G Press
P O Box 9005
Waco, Texas 76714

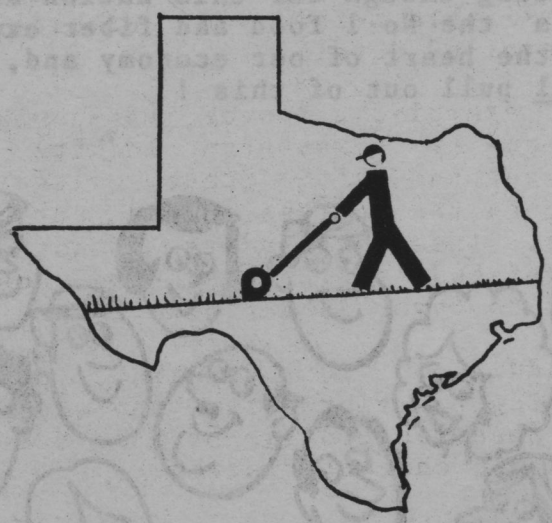
The Complete Guide to Texas Lawn Care by Dr William E Knoop provides all the details on how to have a lush lawn in the southwest.

Whether you're faced with the tough task of establishing a new lawn or renovating an existing one, this book is for you. You'll learn which turfgrass is the best for your lawn. [Did you know there is native grass that is more drought and disease resistant and requires less mowing than bermuda or St Augustine?]

Find out how to properly prepare the soil for sodding or seeding. Learn proper watering and fertilizing techniques that can save you hundreds of dollars. The author shows you how to identify and control common lawn diseases and insects. If you have ever done battle with the host of weeds that are common to Texas, you'll appreciate the author's common sense approach to controlling them.

This 146 page book is illustrated with 30 full-color photos and 20 B&W illustrations.

THE COMPLETE GUIDE TO TEXAS LAWN CARE sells for $12.95 plus tax = $13.61 each in paperback [$17.95 plus tax = $18.87 hardback]. Allow 4-6 weeks delivery.Order from T G PRESS.



NATIONAL GARDEN WEEK

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

(312/655-0010)

The 'horticulturally' rooted effort of 16 organizations succeeded to legislate National Garden Week, April 13 to 19,1986. The resolution passed in the House of Representatives April 14th, just in time for the seeds of celebration to be sown.

The 16 organizations formed an alliance over a year ago to establish this week of national recognition for America's gardeners. Each year 43 million American households eagerly garden. Their gardening activities contribute to the beauty of America and enhance the environment. This commemorative week will recognize gardeners' contributions that increase the quality of life in the United States. National Garden Week will become the focal point for public activities and ceremonies that celebrate gardening.

The National Garden Bureau expresses gratitude and appreciation to each organization that co-sponsored the effort. The success of this legislation is an example of the "horticultural strength" attained when organizations work together to achieve a common goal. The combination of resources and members was effective and highly commendable. Each organization deserves recognition for the effort.

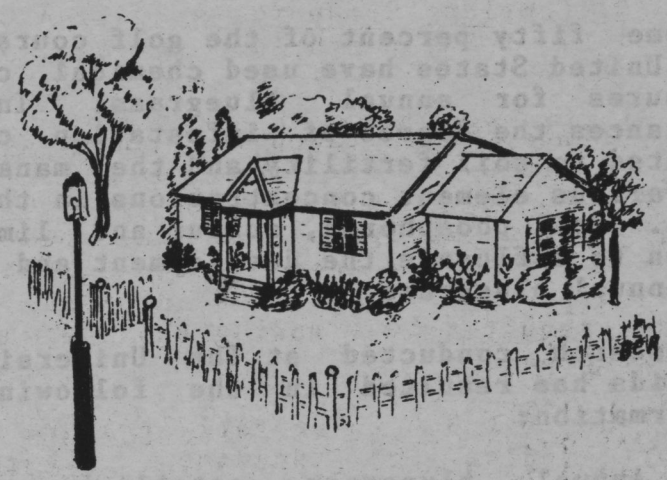
Maggie Oster	All-America Rose Selections
Corinne Willard	All-America Selections
Susan Lathrop	Am Assn of Bot Gdns & Arboreta
Robert Lederer	American Asso of Nurserymen
Charles Huckins	American Hort Society
William Schapaugh	American Seed Trade Asso
Edward Able	American Soc of Lands Arch
Terry Humfeld	Bedding Plants, Inc
Donald Moore	Brooklyn Botanic Garden
Robert Vereen	Home Center Institute
Eliot Roberts	The Lawn Institute
Rodney Brown	Mailorder Asso of Nurserymen
Becky Brese	National Jr Hort Assn
Foil McLaughlin	N Carolina Crop Impro Asso
Ray Roper	Society of Am Florists

National Garden Week will become a focal point for national, state or community activities to celebrate gardening. Events such as educational programs, community beautification projects, gardener award ceremonies, garden tours, demonstrations or other festivities will be planned. Gardeners will have their week for celebration April 12 thru 18,1987 - National Garden Week.

PRACTICAL HOMEOWNER STUDY ON LAWNS AND GARDENS

From: Joanne Eisenhauer
Research Manager
Rodales New Shelter
33 East Minor Street
Emmaus Pennsylvania 18049

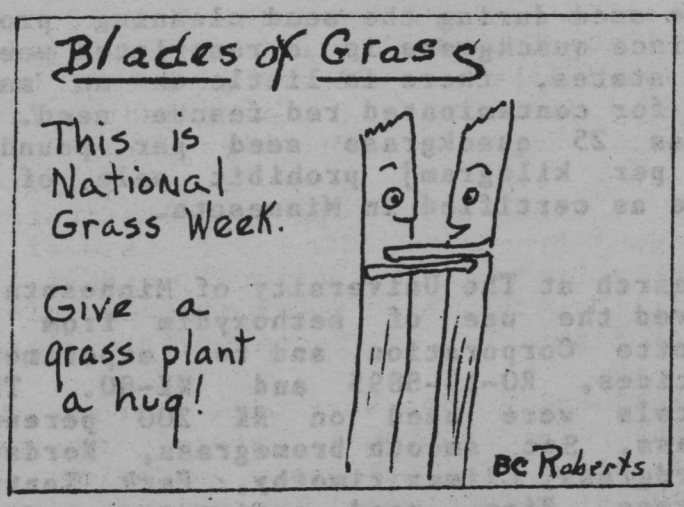
(215/967-5171)



Rodale's Practical Homeowner [formerly New Shelter Magazine] presents to the lawn and garden industry one of the most revealing market research studies ever undertaken.. the "Practical Homeowner Study on Lawns and Gardens".

This study is representative of single family homeowners located throughout the United States. The data is based on 2,319 single family homeowners. Nine out of ten currently own their home and three-fourths of the non-homeowners indicated they may become a homeowner within the next 12 months. The geographic and county size distributions of this sample very closely match those of the U S population.

The study reports on a wide variety of lawn and garden products ... seeds, bulbs, bedding plants, berry plants, ground covers, shrubs, trees, fertilizers, mulches, insecticides, 23 types of lawn and garden tools, 15 types of outdoor power equipment and an assortment of 16 other products associated with a lawn or garden.



To provide insights into the mechanics of the lawn and garden marketplace, each of the reported tables was cross-tabulated against the following data: property size, lawn size, garden size, type of locatity, geographic area. The majority of these data has not been available before and certainly not to this level of detail.

For example, flower transplants are purchased by homeowners located uniformly throughout the United States with a slight skewing to the northeast and north central regions. These consumers cannot easily be distinguished by property size, however they do tend to favor larger size lawns.

In addition to detailed product and purchasing behavior data, the study includes a comprehensive profile of home and homeowner demographic characteristics.

Copies of the study are available at $50.00 per copy from the Marketing Research Department at Rodales New Shelter.

THRESHING THE JOURNALS

(REVIEW OF CURRENT TURFGRASS RESEARCH LITERATURE)

EFFECTS OF PHOSPHORUS, SULFUR, CALCIUM HYDROXIDE AND pH ON GROWTH OF ANNUAL BLUEGRASS

J J Varco and J B Sartain

Soil Science Journal 1986 Volume 50 Number 1 pages 128-132

Some fifty percent of the golf courses in the United States have used chemical control measures for annual bluegrass. In many instances the degree of infestation can be related to soil fertility and the management of various element concentrations in the root zone. Soil phosphorus, sulfur and lime are known to influence the development and vigor of annual bluegrass.

Research conducted at The University of Florida has resulted in the following new information:

- Annual bluegrass establishment and average clipping yields were increased where phosphorus and lime were applied.
- Annual bluegrass establishment and average clipping yields were decreased where sulfur was used.
- The extent of the phosphorus stimulation depends on how much sulfur and lime are used.
- The extent of the sulfur inhibition on annual bluegrass depends on how much phosphorus and lime are used.
- Annual bluegrass has a high phosphorus requirement for healthy vigorous growth.
- Annual bluegrass stands can be reduced by acidifying the zone of seed germination using sulfur.
- In theory, solutions of hydrochloric, sulfuric and phosphoric acid can be used to establish pH levels of 3.0, 4.0, 5.0, and 7.0 in the soil. Annual bluegrass seed germinated least at pH 3.0. Abnormal germination - emergence of the plumule only - was greatest at pH 4.0, but was still evident at pH 5.0. The decrease in radicle development at low soil pH [high hydrogen ion concentration] is likely because of a loss of membrane integrity and thus inhibition of cell division in the root tip.
- A high phosphorus requirement in annual bluegrass is the result of a slight increase in soil pH from added phosphorus and less aluminum ion uptake because of an adsorption-precipitation reaction of aluminum and phosphorus at the the root surface. Thus, in turf stands where annual bluegrass is to be eliminated, do not apply phosphorus unless a deficiency is noted with the desired turfgrasses.
- Where sulfur is used to reduce the encroachment of annual bluegrass, keep track of soil pH to prevent getting the soil so acid that desired turfgrasses will be injured. Only the top one inch [2.5 centimeters] of soil need to be made acid to reduce emergence and growth of annual bluegrass.

QUACKGRASS CONTROL IN RED FESCUE SEED PRODUCTION

D L Wyse, L J Elling, D B White and R L McGraw

Weed Science 1985 Volume 34 Number 1 pages 94-97

In Minnesota, quackgrass is a major weed problem in red fescue seed fields. This weed not only reduces seed yields but also seed quality. Since it is not economically feasible to remove quackgrass seed from red fescue seed during the seed cleaning process and since quackgrass is a restricted weed in most states, there is little or no market value for contaminated red fescue seed. As many as 25 quackgrass seed per pound [55 seeds per kilogram] prohibit sale of red fescue as certified in Minnesota.

Research at The University of Minnesota has involved the use of sethoxydim from BASF Wyandotte Corporation and two experimental herbicides, RO-13-8895 and KK-80. These chemicals were used on NK 200 perennial ryegrass, Sac smooth bromegrass, Nordstern orchardgrass, Climax timothy, Park Kentucky bluegrass, Rise reed canarygrass, meadow fescue and Pennlawn, Ruby, Dawson and three experimental red fescues - MN 67123, MN 673 and MN 6354.

Quackgrass Control in Red Fescue Seed Production continued

The following results were obtained:

- When the three herbicides were applied postemergence at rates of one pound of active ingredient per acre [1.1 kilogram per hectare], severe injury was noted on all species except red fescue.
- Red fescue was tolerant in both greenhouse and field experiments.
- Sethoxydim and RO-13-8895 effectively controlled quackgrass in Pennlawn red fescue. KK-80 was not effective.
- Sethoxydim stops seedhead formation but does not entirely eliminate perennial quackgrass stands under field conditions. Thus, quackgrass regrowth requires an annual application of herbicide to keep red fescue seed free of quackgrass seed.
- Since use of the herbicide did not increase seed yields above that where quackgrass was present, the value of these treatments resides in obtaining higher quality red fescue seed.

ESTABLISHMENT AND ROOTING OF ZOYSIAGRASS AS AFFECTED BY PREEMERGENCE HERBICIDES

J D Fry, P H Dernoeden and J J Murray

Weed Science 1986 Volume 34 Number 3 pages 413-418.

As long as three years may be required for the establishment of zoysiagrass from plugs. Environmental conditions, cultural practices and plug spacing have an effect on this. Bare ground between plugs makes an ideal place for weeds to get started and then compete with zoysiagrass. Annual grassy weeds can become so aggressive as to retard the spreading of zoysia. The likelyhood of harmful effects of herbicides for control of annual grasses is of concern, particularly in relation to root development from zoysia stolons.

Research conducted at The University of Maryland involved use of Meyer and Belair zoysiagrass plugs. The following observations were made:

- Preemergence herbicides for control of smooth crabgrass and goosegrass did not reduce root weight or length of zoysiagrass grown in sand under greenhouse conditions.
- Belair zoysiagrass plugs grown in a sandy loam soil had less roots where bensulide and simazine were used.
- In field plots, Meyer zoysia plugs treated with simazine, oxadiazon and siduron developed more stolons than plugs treated with bensulide or metribuzin. They had more stolons than the untreated smooth crabgrass infested plots.
- After two growing seasons, there was less zoysiagrass where metribuzin was used.
- Oxadiazon, DCPA and Siduron improved field establishment of Meyer zoysiagrass in locations where the zoysia would be competing with crabgrass.
- Where competition from annual grassy weeds is minimal, Meyer zoysiagrass establishment is not improved by use of preemergence herbicides.

TOLERANCE OF TALL FESCUE AND KENTUCKY BLUEGRASS TO CHLORSULFURON UNDER FIELD CONDITIONS

B M Maloy and N E Christians

Weed Science 1986 Volume 34 Number 3
pages 431-434

A new herbicide that is 10 to 100 times more active than most weed killers has been labeled by DuPont for selective control of both broadleaf and grass weeds in cereal crops. This herbicide, Glean, contains chlorsulfuron.

Since tall fescue is a very difficult species to control selectively in a bluegrass turf, chlorsulfuron has been evaluated at Iowa State University for tolerance levels of both species. Parade, Adelphi, Glade and Rugby Kentucky bluegrasses and Kentucky 31 fescue were treated in field experiments with chlorsulfuron. The following results are of interest:

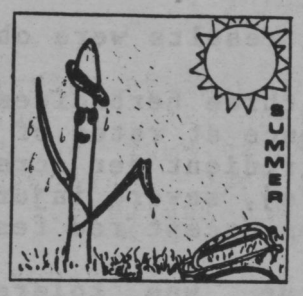
- Kentucky bluegrass can tolerate rates of chlorsulfuron in split applications 14 days apart up to 6 ounces per acre [424 grams per hectare] without showing serious detrimental effects.

- As the chlorsulfuron rate of application increases, clipping weights of Kentucky bluegrass decrease, although turf quality was not affected.

- Tall fescue was severely damaged by chlorsulfuron at rates of 2 ounces per acres [141 grams per hectare].

- Chlorsulfuron works very slowly, particularly following fall applications. Four to seven weeks to achieve complete kill of tall fescue is common.

- Kentucky bluegrass can be seeded into treated areas the season following application of chlorsulfuron.



TOLERANCE OF RED FESCUE AND BENTGRASS TO SETHOXYDIM

J H B Bulter and A P Appleby

Weed Science 1986 Volume 34 Number 3
pages 457-461

A BASF Wyandotte Corporation herbicide, sethoxydim is presently registered for use on red fescue grown for seed. Sethoxydim is a broad spectrum grass killer that is selective in broadleaf crops. It controls a wide variety of grasses, including cool and warm season annual and perennial species. Several fine-leaf fescues, including red fescue and rattail fescue are highly tolerant of sethoxydim.

Research at Oregon State University has been conducted to compare the tolerance of red fescue with that of bentgrasses, Italian ryegrass, tall fescue, downy brome and annual bluegrass.

Pennlawn, Polar, Futura, Hawk, Wintergreen, Ruby, Cascade, Koket, Banner, Waldorf and Scarlet fine fescues were included in these studies. Highland, Seaside Astoria and Penncross bentgrass were compared with the fine fescues. The following results have been reported:

- In the field, 26 pounds active ingredient sethoxydim was required per acre [30 kilograms per hectare] to reduce the growth rate of Pennlawn red fescue by 50 percent. In the greenhouse, 13 pounds active ingredient sethoxydim was required per acre [15 kilograms per hectare].

- In the field, Penncross bentgrass was approximately 400 times more susceptible than Pennlawn red fescue. In the greenhouse, Penncross was 1400 times more susceptible than Pennlawn.

- Plants treated in field and in greenhouse were at different growth stages and thus different results were expected.

Tolerance of Red Fescue and Bentgrass to Sethoxydim continued

- The technical grade sethoxydim requires use of xylene and a surfactant as a solvent. These were as toxic to red fescue without sethoxydim as when sethoxydim was included.

- Cultivars of red fescue differed in their response to sethoxydim but cultivars of bentgrass did not. Pennlawn red fescue was one of the more sensitive fine fescue cultivars. Younger plants are more sensitive than older plants.

- In greenhouse tests, the following amounts of sethoxydim were required to reduce the growth rate by 50 percent:

  * Annual bluegrass - 3.5 pounds of active ingredient per acre [4 kilograms per hectare];

  * Downy brome - 5 ounces of active ingredient per acre [0.37 kilograms per hectare];

  * Tall fescue - 3 ounces of active ingredient per acre [0.22 kilograms per hectare];

  * Italian ryegrass - 1/4 ounce of active ingredient per acre [0.017 kilograms per hectare].

GENOTYPIC VARIABILITY IN BERMUDAGRASS DAMAGE BY ECTOPARASITIC NEMATODES

A C Targan and P Busey

HortScience 1985 Volume 20 Number 4
pages 675-676

Bermudagrasses are known to be sensitive to parasitism by nematodes. Sting, lance, ring, root knot, cyst, stubby root, spiral and stunt nematodes all have detrimental effects on grasses. Chemical control of nematodes can have undesirable effects on the turf.

An experiment at The University of Florida was designed to determine the relative injury caused by nematodes extracted from turf soil on 8 bermudagrass clones. In addition, the reproduction of different nematodes on roots of different bermudagrasses was evaluated. Tifgreen, Tifdwarf, Tifway and 5 unnamed selections were included in the study. Grasses grown in pots were inoculated with known amounts of sting, lance, ring, root knot, stubby root and spiral nematodes. The following observations were made:

- Overall nematodes reduced root dry weight by 13 percent.

- Tifgreen and Tifdwarf [low growing cultivars] were subject to greater root weight reductions [39 and 36 percent, respectively]. They also supported higher densities of the lance nematode than other bermudagrasses. Tifway only had a one percent reduction in root growth.

- Three months after inoculation, bermudagrass selections produced clippings that were 37 percent greater than those from non-inoculated grasses. Thus, nematodes initially stimulate shoot growth.

- Five months after inoculation, there was a 14 percent reduction in shoot growth. This substantiates the long term detrimental effect of nematodes on turf.

- The more root damage the more nematodes found in soil around the roots. Lance and ring nematodes increased 8 and 33 fold,respectively, but most other nematodes maintained about the same population as originally introduced. It may have been that inoculation and growth conditions were inadequate or that a 5 month period was insufficient for population increases of some nematodes.

- Bermudagrasses demonstrate differences in resistance to nematodes and thus some unacceptable grass types for golf greens may have genes for resistance which could be incorporated in putting green type bermudagrasses.

OSMOTICALLY INDUCED WATER STRESS ON FERTILIZER BURN OF GLADE KENTUCKY BLUEGRASS

S J Johnson and N E Christians

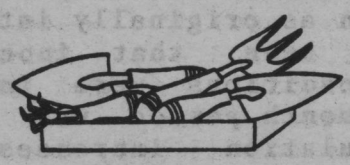
HortScience 1985 Volume 20 Number 4
pages 772-773

The commercial lawn care industry is making good use of liquid fertilizers in meeting plant food needs of turf. In the application process, physiological drought may be noted when an excess of soluble salts, either on the foliage or in the soil solution, accumulates. The resulting burn may take the form of leaf tip browning or a bleaching of the entire leaf blade, depending on humidity around the plant and growth conditions within the plant. Increasing levels of soil moisture stress are believed to cause more severe fertilizer burn.

A controlled greenhouse experiment at Iowa State University utilized a hydroponics system in which moisture stress could be regulated. The following observations are of interest -

- Liquid urea fertilizer treatments on Glade Kentucky bluegrass could be made to burn the foliage, but the burn was not found to be related in any way to moisture stress.

- The fertilizer treatment had no detrimental effect on moisture content of the tissue and plant growth when relative humidity varied from 50 to 75 percent during the day and from 65 to 87 percent at night.



TIFDWARF BERMUDAGRASS GROWTH RESPONSE TO CARBOXIN AND GIBBERELLIC ACID DURING SUBOPTIMUM TEMPERATURES.

A E Dudeck and C H Peacock

HortScience 1985 Volume 20 Number 5
pages 936-938

Tifdwarf bermudagrass is used for golf green turf in the southern United States. It grows well within a temperature range of 79 to 95 degrees Fahrenheit [26 to 35 degrees Celsius]. During winter the grass becomes semi-dormant to dormant depending on the latitude. Many golf greens along the Gulf Coast are not overseeded because the bermudagrass does not become adequately dormant during mild winter weather. It does get sufficiently cold for the Tifdwarf to develop undesirable purple foliage 24 to 48 hours following exposure to chilling temperatures.

Research at The University of Florida has concerned the use of carboxin, a systemic fungicide and gibberellic acid on Tifdwarf bermudagrass putting green turf as an aid in overcoming the effects of low temperatures. The following observations were made.

- When carboxin was applied at rates of 20 and 40 pounds per acre [22 and 45 kilograms per hectare] and gibberellic acid was applied at rates of 0.9 and 1.8 ounces per acre [62 and 124 grams per hectare] to Tifdwarf bermudagrass golf greens, the response to both chemicals was linear. The magnitude of the top-growth response was related to temperature - greatest near optimum temperature.

- A single application of carboxin lasted seven weeks when mean weekly minimum air temperatures ranged from 48 to 66 degrees Fahrenheit [8 to 19 degrees Celsius]. Under the same temperature conditions a single application of gibberellic acid lasted two weeks.

- When growth rates of fresh clippings dropped to about one half pound per 1000 square feet per day [25 kilograms per hectare per day] acceptable turf quality on putting greens was not attained even with use of chemical growth regulators.

- Under low traffic conditions, carboxin produced blue-green foliage in 5 or more days and gibberellic acid produced yellow-green foliage in 1 to 2 days. Both chemicals eliminated the purple cast commonly associated with Tifdwarf bermudagrass during suboptimum temperatures.

- Carboxin and gibberellic acid should not be considered a substitute for overseeding, but only used as a temporary growth stimulant during occasional periods of suboptimum temperatures.

THRESHING THE JOURNALS CONTINUED

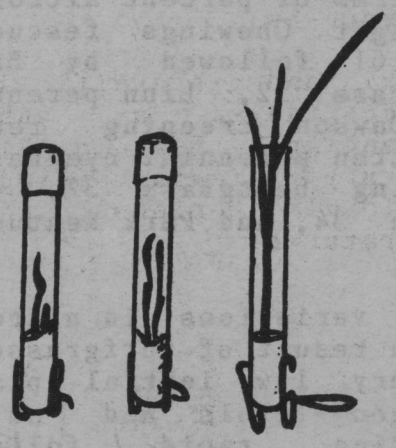
THE ONTOGENY OF SOMATIC EMBRYOS FROM LONG-TERM CALLUS CULTURES OF RED FESCUE

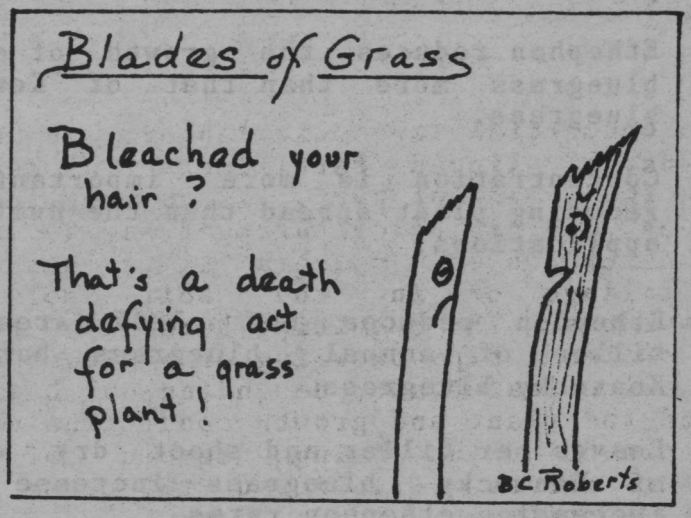
W A Torello, R Rufner and G A Symington

HortScience 1985 Volume 20 Number 5
pages 938-942

Tissue culture research at the University of Massachusetts has concerned the development of techniques for the regeneration of whole red fescue plants from callus tissue. The regeneration of plants from single cells and long-term callus cultures is essential before tissue culture techniques can be utilized for plant improvement. Most cereal and forage plants have produced new plants through tissue culture but regeneration frequency is often sporadic. Most cultures lose their potential for regeneration within several subcultures. Somatic embryogenesis from callus, cell suspensions and protoplasts is possible for a number of grasses.

Red fescue regenerants, after an 18 month culture period, appeared to be typical red fescue seedlings, with the exception that from 8 to 12 percent were albino. Healthy red fescue plants developed in this way are preferred for genetic and induced mutation research. The long term embryogenic capability of red fescue cultures in this study provides an ideal working system which has a high level of assurance for regeneration after extended experimental periods. Such potential is useful in cell selection studies which often require gradual exposure periods to chemical or physical stress.





KENTUCKY BLUEGRASS AND ANNUAL BLUEGRASS RESPONSE TO ETHEPHON

J L Eggens and C P M Wright

Journal of the American Society for Horticultural Science 1985 Volume 110 Number 5 pages 609-611

Football and soccer fields deteriorate rapidly once infested with annual bluegrass. Cleat injury on annual bluegrass is more serious than on Kentucky bluegrasses. Because of its prolific seed production, rapid germination and establishment in open or weakened perennial turf and its prostrate growth habit and rapid tiller formation, annual bluegrass can quickly become a major component of well fertilized and irrigated athletic fields. Susceptibility of annual bluegrass to drought, disease, high temperature and traffic injury make it highly unreliable for sports turf.

Research at the University of Guelph on use of ethephon for control of annual bluegrass in Adelphi, Nugget and Sydsport Kentucky bluegrasses has produced the following results:

- Ethephon reduces the turf spread of Adelphi and annual bluegrass in comparison to Nugget and Sydsport which were not affected.

- Sydsport is more competitive against annual bluegrass than other Kentucky bluegrasses.

Kentucky Bluegrass & Annual Bluegrass
Response to Ethephon continued

- Only Sydsport does not change root and shoot dry weight or rhizome length with increasing ethephon concentrations within the treatment range of 11 to 44 ounces per acre [0.8 to 3.2 kilograms per hectare].

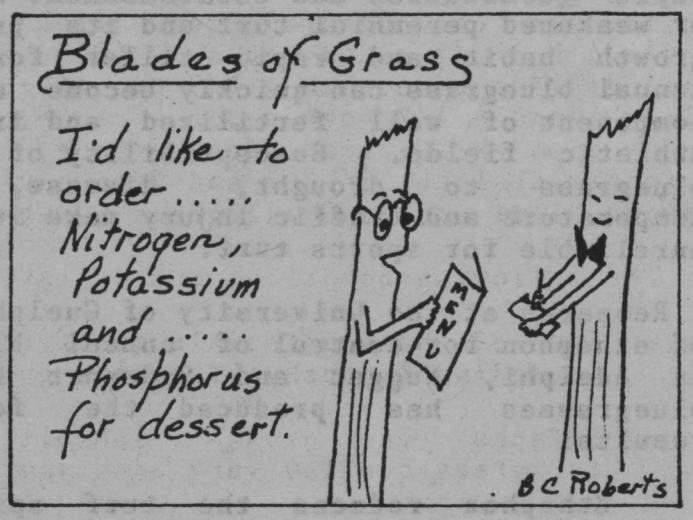
- Ethephon reduces the growth of annual bluegrass more than that of Kentucky bluegrass.

- Concentration is more important in reducing plant spread than the number of applications.

- Ethephon reduces the leaf area per tiller of annual bluegrass but not Kentucky bluegrass.

- Leaves per tiller and shoot dry weight of Kentucky bluegrass increase with increasing ethephon rates.

- Canopy height of Kentucky bluegrass is suppressed by ethephon, where as annual bluegrass canopy height is not. At mowing heights of just over one inch and under 2 inches [3 to 4 centimeters] where scalping injury to Kentucky bluegrass does not normally occur, the increased leaf area removal from annual bluegrass would allow Kentucky bluegrasss to compete more effectively with annual bluegrass in athletic field turf.



FOLIAR NITROGEN-UPTAKE BY EIGHT TURFGRASSES GROWN IN CONTROLLED ENVIRONMENT.

R W Wesely, R C Shearman and E J Kinbacher

Journal of the American Society for Horticultural Science 1985 Volume 110 Number 5 pages 612-614.

Liquid fertilization of lawns involves applications of nitrogen at rates of 1/2 to 1 pound of nitrogen per 1000 square feet [2.5 to 5.0 grams of nitrogen per square meter] with 3 to 5 gallons of water per 1000 square feet [120 to 200 milliliters of water per square meter]. Some fertilizer is foliarly absorbed at these rates since nutrients remain on leaves until washed into the soil by irrigation or rain. The efficiency of this absorption has been studied at the University of Nebraska. The following results are of interest.

- Maximum nitrogen uptake occurs 24 hours after treatment.

- Most turfgrasses increase in total nitrogen through a 72 hour period.

- Dry matter production of plants is stable through a 72 hour period.

- Inherent morphological, physiological and anatomical factors contribute to the species and cultivar differences in efficiency of foliar nitrogen uptake.

- In terms of percent nitrogen recovery, Highlight Chewings fescue is highest with 61 followed by Baron Kentucky bluegrass 52, Linn perennial ryegrass 48, Dawson creeping red fescue 38, Manhattan perennial ryegrass and Seaside creeping bentgrass 37, Kentucky 31 fescue 34, and Park Kentucky bluegrass 31.

- These variations in nitrogen recovery are a result of turfgrasses responding to very low initial plant and soil nitrogen levels and an environment promoting rapid foliar nitrogen absorption.

THREADING THE JOURNALS CONTINUED

BERMUDAGRASS TURF RESPONSES TO NITROGEN SOURCES

G L Horst, L B Fenn and N B Dunning

Journal of the American Society for Horticultural Science 1985 Volume 110 Number 6 pages 759-761

Nitrogen fertilizers influence turfgrass root growth, disease susceptibility, heat, cold and drought tolerances and regrowth potential. Inefficient plant utilization of nitrogen as well as volatilization after application, denitrification, and leaching below the root zone cause losses and waste of this nutrient. The nitrogen source also has a direct influence on available soil calcium. A particular nitrogen source may either precipitate or increase initial soil calcium availability. Since calcareous soils do not necessarily have high levels of available calcium, this relationship has a wide range of application.

Research at Texas A & M University has compared ammonium forming and nitrate nitrogen fertilizers amended with calcium nitrate on the performance of Santa Ana and common bermudagrass. Nitrogen sources used included urea, 4 urea: 1 calcium nitrate, ammonium sulfate, calcium nitrate, ammonium nitrate, methylene urea A and B [U/F ratio of 2.0 and 1.6]. Rates of nitrogen application were made at 1.4, 1.6 and 2 pounds per 1000 square feet [7, 8, and 10 grams per square meter]. Repeat treatments were made throughout the season according to the experimental design.

The following observations were made.

- The addition of calcium to the urea formulation enhances nitrogen utilization by causing the turfgrass plants to increase root and rhizome dry matter production.

- The addition of calcium to ammonium nitrogen sources increases ammonium absorption and dry matter accumulation.

- Color, quality and yield of foliage are improved and persist longer with the addition of calcium to urea nitrogen sources.

- Treatments did not increase tissue nitrogen content but the addition of calcium did enhance nitrogen utilization.

RESPONSE OF KENTUCKY BLUEGRASS TO FOUR GROWTH RETARDANTS

N E Christians

Journal of the American Society for Horticultural Science 1985 Volume 110 Number 6 pages 765-769.

Growth retardants are being used in early spring to cut back on seedhead formation and also to slow down growth during periods of rapid leaf elongation. Timing of application is important. Often this is difficult for the lawn care specialist to achieve. Weather, large numbers of customers and limited equipment available at any given time cause applications to be made at times less than optimal. The result is inconsistencies in turfgrass response. Before growth retardants can be used effectively by the lawn care industry, a better understanding of ways these materials interact with the environment at various stages of grass development will be required.

Research at Iowa State University on a Kentucky bluegrass blend of Parade, Adelphi, Glade, and Rugby has involved use of mefluidide and ethephon as well as experimental formulations BAS 106 00 W and EL-500. Ethephon was applied at rates of 2, 4 and 6 pounds per acre [2.24, 4.48 and 6.72 kilograms per hectare]; mefluidide at rates of 1/4 and 1/2 pound per acre [0.28 and 0.56 kilograms per hectare]; BAS experimental at 1 1/2, 3 and 4 1/2 pounds per acre [1.68, 3.36 and 5.04 kilograms per hectare] and EL experimental at 3/4, 1 and 2 pounds per acre [0.84, 1.21 and 1.40 kilograms per hectare].

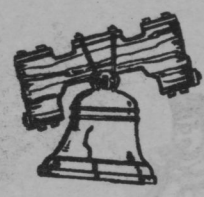
The following notations are of interest.

- Each of these materials is effective in retarding Kentucky bluegrass growth.

- Effects on growth inhibition and turfgrass quality vary each year.

- Ethephon is not effective in reducing clipping yields in greenhouse studies.

- None of the growth retardants inhibit root organic matter production or rhizome weight in greenhouse studies.



AN EVALUATION OF GERMINATION MEDIA FOR TURFGRASS SALINITY STUDIES

A E Dudeck, C H Peacock and T J Sheehan

Journal of the American Society for Horticultural Science 1986 Volume 111 Number 2 pages 170-173

Overseeding of cool-season turfgrasses into dormant warm-season turf in the southern United States provides an improved playing surface as well as a green ground cover for golf courses, sports facilities and home lawns. More saline water is being used for turf irrigation in Florida and other coastal states. Thus, a rapid technique to screen cultivars of cool-season turfgrasses for salt tolerance during the germination period is required. Present germination techniques involve use of covered dishes containing moistened filter papers or blotters or salinized soil media. These have low water-holding capacity. Drying and rewetting causes cyclic salt concentrations within treatments.

Research at the University of Florida has involved the use of agar in tests to determine the salt tolerance of Derby perennial ryegrass. With full strength sea water formulated at 35,000 parts per million salts, a synthetic sea water was made to contain 78.8 percent sodium chloride, 9.4 percent magnesium sulfate, 7.3 percent magnesium chloride, 2.3 percent calcium chloride, 0.7 percent sodium bicarbonate and 0.6 percent potassium chloride. Salt treatments of 0, 1000, 2000, 3000, 4000 and 5000 parts per million were used. The following results were noted.

- Agar concentrations of 0.5, 1, 2, and 3 percent solidifies with up to 35,000 parts per million of total salts derived from a formula for full-strength sea water.

- Water loss from petri dishes sealed with plastic film after 28 days is negligible.

- Germination of Derby perennial ryegrass on unsalinized agar is not different from germination on unsalinized blotters.

- Total germination of Derby perennial ryegrass averaged 94 percent and is unaffected by salt concentrations up to 5000 parts per million.

- Germination rate in days to 50 percent germination is delayed from about 4 where there is no salinity to about 5 where there is 5000 parts per million salts present.

- In these tests no problems are noted with seedling diseases or contamination of the agar.

THRESHING THE JOURNALS CONTINUED

SOIL CULTIVATION AND INCORPORATION EFFECTS ON THE EDAPHIC PROPERTIES OF TURFGRASS THATCH

T K Danneberger and A J Turgeon

Journal of the American Society for Horticultural Science 1986 Volume 111 Number 2 pages 184-186

Thatch causes increased susceptibility of the turf to cold, heat and drought injury. It increases the severity of disease and insect problems. A complete removal of thatch often results in severe injury to the turfgrass community because much of the root system is located within the thatch layer.

Thatch may be modified by the incorporation of soil. This is either accomplished by topdressing or by core cultivation. The larger the area to be treated, the greater the cost for topdressing and the more economical core cultivation becomes. The addition of soil into the thatch improves the environment for microbial activity. Since thatch has a low moisture retention because of the predominance of macrosize pores and a low-bulk density, the addition of soil increases moisture retention and bulk density. Thatch also has a low cation exchange capacity.

Research at the University of Illinois has been conducted on Penncross creeping bentgrass and Merion Kentucky bluegrass to assess quantitatively the effects of soil incorporation on thatch.

The following conclusions are of interest.

- Soil incorporation into thatch reduces the percentage of ash content and cation exchange capacity but increases the bulk density and cation exchange capacity-bulk density which is an expression of the cation exchange capacity on an undisturbed volume basis.

- The extent to which soil incorporation brings about changes in the thatch depends on the amount of soil incorporation and the number and type of cultivation methods employed.

- While thatch reduction may not occur, soil incorporation brings about a modification of the thatch layer making it a more desirable growing medium in a relatively short time.

THE LAWN INSTITUTE

County Line Road
P. O. Box 108
Pleasant Hill, Tennessee 38578-0108

Bulk Rate
U. S. Postage
PAID
Pleasant Hill TN
Permit No. 3

ADDRESSEE....
HELP US KEEP
YOUR ADDRESS
CORRECT.....
If address is wrong
in any respect, please
correct directly, and
return to us.
THANK YOU

K T PAYNE
MI ST UN
CROP & SOIL SCI
E LANSING
MI 48824

Lawn Institute Harvests is published four times a year by The Better Lawn and Turf Institute. The headquarters office address is P O Box 108, Pleasant Hill, Tennessee 38578-0108. Phone: 615/277-3722. Inquiries concerning all aspects of this publication may be addressed to the headquarters office.

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 interest and concerns.

Editor: Eliot C Roberts, PhD

Associate Editor: Beverly C Roberts, MA

Printer: Crossville Chronicle (Tennessee)