JULY 1990

LAWN INSTITUTE

Harvests

Volume 37 Number 2

THE HARVEST MIX

This issue of Harvests contains reviews of 11 talks presented at the 1989 Guelph Turfgrass Institute Symposium on Turfgrass Management.

We are proud to announce the 1990-1991 Variety Review Board cultivar list of quality lawngrasses.

Dr Joseph Howland's historical review entitled "The Lawn Industry in America" should be of interest as follow-up to the special issue of Harvests, January 1990 on "Lawns - Historical Perspective."

Threshing the Journal covers topics of: Research Reports, Warm Season Grasses, and Plant Competition.

Two announcements that came to P O Box 108 round out the issue.

GUELPH TURFGRASS INSTITUTE

SYMPOSIUM ON TURFGRASS MANAGEMENT

November 7,1989
University of Guelph
Guelph, Ontario Canada

Research reports were presented by faculty and staff of the Guelph Turfgrass Institute on the first day of this two day symposium. The Institute, formed in 1987, is unique in the field of turfgrass science and education where team effort in research is so important. Dr Lee Burpee has served as founding Director; now Dr Chris Hall has been named as the second Director of GTI. Eleven faculty members are active in this interdisciplinary program.

In order to appreciate the wealth of information available from this faculty, over-views of each presentation made at the seminar are included here. More detailed research reports are released by The Guelph Turfgrass Institute. For more information, contact: Dr J Christopher Hall, Director GTI, Department of Environmental Biology, University of Guelph, Guelph Ontario N1G 2W1, Canada [phone: 519/824-4120 ext 2740].

GUELPH TURFGRASS INSTITUTE

Dr Clay Switzer
Chairman Finance Committee

Dr Clay Switzer is an international authority in turfgrass science, having served as President of the International Turfgrass Society. He is a former Dean of the Ontario Agricultural College at the University of Guelph and Deputy Minister Ontario Ministry of Agriculture and Food. Now, chairman of the Guelph Turfgrass Institute Finance Committee, he is intimately involved in the implementation of the Institute concept. The following notations are important in the success of this venture.

- The GTI will provide identity and serve as a focal point for the Canadian turf industry. It will be a common bond shared by all sectors of the industry.

- The GTI will provide a facility where members of the industry, and the general public can come to get information on management practices, new cultivars, the effects of turfgrass on the environment, etc. Thus, public awareness about the turf industry, and its importance will be increased.

- The GTI will provide a facility necessary for the collating and recording of data essential for the registration and environmental acceptance of new grass cultivars, pesticides and fertilizers.

- The GTI will provide information through research and public education that is necessary for the development of policies relating to grassed areas in Ontario [and in other provinces]. Governments will become more aware of the size, scope and importance of the turf industry.

- Public access to publications and computer references will be available, along with a direct computer link to other international turfgrass centres.

- Students will be attracted into turfgrass management and related fields of study because of the presence of a world-class facility.

- The turfgrass industry is a $500 million dollar industry in Ontario and is growing as more people with leisure time [including more retired people] want access to high quality turf - golf courses, parks, lawns. The GTI will provide a site for interaction among the various sectors of this rapidly growing industry.

- Almost $200,000/year goes into turf research at Guelph through the Institute. There are 11 professionals who are involved in plant breeding, turf management, ecological and environmental studies, weed, disease & insect control, use of fertilizers, testing new cultivars, drainage and irrigation. The GTI will facilitate this research through the provision of on-site laboratories, computers and library research.

GUELPH TURF TEAM

Back row [L to R]:

- Dr Jack Eggens [Prof]
- Cindy Bowhey [Technician]
- Dr Gerry Stephenson [Prof]
- Gord Riddle [Grad Student]
- Dr Ken Carey [Research Associate]
- Lorraíne Goulty [Technician]
- Dr Ed Gamble [Prof]
- Pat Tucker [GTI Short Course Coordinator]
- Dr Mark Sears [Prof]

Seated [L to R]

- Dr Chris Hall [Prof]
- Dr Lee Burpee [Prof]
- Norm McCollum [Superintendent of GTI Research Plots]
- Annette Anderson [OMAF Extension Specialist]

Other members of the Guelph Turfgrass Institute not pictured:

- Dr Paul Voroney [Prof]
- Dr Tom Bates [Prof]
- Dr Jack Alex [Prof]
- Dr Clay Switzer [Prof]
- Dr Keith Solomon [Prof]

New Developments in Weed Control and Growth Regulation

Dr Chris Hall
Department of Environmental Biology

Dr Chris Hall is a specialist in weed science, growth regulation and physiology of herbicides at the University of Guelph. In this report, he has placed emphasis on the following points to help improve weed control in turf.

- Chemicals are needed for weed-free turf. However, there is no doubt that herbicide use can be reduced through proper management techniques, sprayer calibration and application of herbicides at the correct time of year.

- Five good reasons to rid turf of weeds include:
  - weed competition results in poor turf growth;
  - weeds cause increases in labor and equipment costs;
  - turf quality is reduced;
  - prospects for diseases and insects increase;
  - weeds present safety hazards, such as bees, around dandelions and clover, as well as allergies.

- Weed control is influenced by several conditions that make them more or less difficult to get rid of :
  - a competitive grass cover weakens weeds and makes them easier to control;
  - some weed types are more readily controlled than others;
  - some types of turf are more susceptible to weeds than others;
  - some cultural methods used on turf benefit weeds;
  - herbicides work better on some weeds than on others;
  - method of application varies in weed control;
  - time of application has an influence on weed control.

- The objective of all weed control is to create a dense, healthy stand of turf.

- Weed control utilizes the following three methods:
  - preventive;
  - mechanical;
  - chemical.

- Preventive weed control places emphasis on:

  - Proper seedbed preparation
    - stimulation of weed seed to affect germination prior to weed removal;
    - prevention of weed seed production;
    - exhaust propagules.

  - Proper seeding
    - selection of turf species;
    - seeding rate;
    - use of clean seed;
    - appropriate time of seeding.

  - Proper management
    - fertilization;
    - mowing height and frequency;
    - watering;
    - check regularly for weeds so that control may be scheduled when they are most susceptible.

- Mechanical weed control includes the following three practices:
  - mowing;
  - tillage;
  - physical removal.

- Chemical weed control involves the use of herbicides. They are:
  - preemergence;
  - preemergence-early postemergence;
  - postemergence.

- Preemergence weed control is recommended for crabgrass. Herbicides include:
  - Bensulide
  - Chlorthal-dimethyl
  - Siduron
  - Trifluralin.

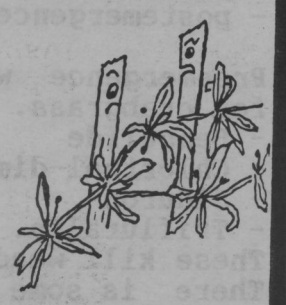
  These kill weed seed after germination. There is some effect on annual bluegrass. Seeding of turfgrasses is not recommended after treatment. Spring treatment produces good results. Limited fall treatments are made.

New Developments in Weed Control and Growth Regulation CONTINUED

- Pre-emergence, early post-emergence herbicides include:
  - MON 15100 EC - good up to early tiller stage. This herbicide can be used on Kentucky bluegrass and on bentgrass for control of crabgrass and has also shown some promise for control of:
    - oxalis;
    - clover;
    - black medic.
  - Treatments may be made at two weeks after germination.
- Postemergence crabgrass control:
  - Acclaim - Fenoxaprop-ethyl - good for hairy and smooth crabgrass, barnyardgrass, green and yellow foxtail and witchgrass.
  - Use on ryegrass, fescues, bluegrass that is well established and annual bluegrass that is well established. Should not be used on bentgrass.
  - Restrict use during hot dry weather. Apply from 1 to 2 leaf stage to multi-tiller stage. More than one application may be required.
- Postemergence - broadleaf weeds:
  - Four herbicides are recommended:
    - 2,4-D
    - MCPA
    - MCPP
    - Dicamba.
    - Combinations of these 4 herbicides.
  - Dicamba is root absorbed by trees and shrubs. It stays active in the soil. Good for most weeds. Treat new turf after second or third mowing.
  - MCPP is safe on bentgrasses whereas 2,4-D and dicamba at high doses may damage bentgrasses when applied during hot weather.

Blades of Grass

Being covered with carpetgrass isn't what I meant when I ordered wall to wall carpeting !



B C Roberts

EVALUATION OF INSECTICIDES FOR GRUB CONTROL

Dr Mark Sears
Department of Environmental Biology

Dr Mark Sears is turfgrass entomologist at the University of Guelph. He has worked with Fred Vaughn, General Manager, Agricultural Products Services Development Company of Cambridge, Ontario on new insecticides for control of grubs. The European chafer and white grubs are the topic of this report. The following points were emphasized.

- Evaluations for efficacy of insecticides must be made at different times of the year.
- Eggs are deposited in the summer time.
- The grubs overwinter as the third instar.
- Pesticides are effective on the second and third instar.
- In order to be cost effective there should be 5 grubs per 0.1 square meter [one square foot].
- Insecticides evaluated included:

Diazinon	Basudin EC
Triumph	Banisect EC
GXS 8743	Dylax L

- Best results were obtained with:
  Triumph 480 L
  Triumph 10 G

  Diazinon control was also good.

  Nematodes in solution [GXA 8731C1] were not as good as Triumph and Diazinon.

Studies on Sand Root Zones

Dr Paul Voroney
Department of Land Resource Science

Dr Paul Voroney is a soil scientist at the University of Guelph with interest in sand root zones. These, including the U S Golf Association root zones, are used for production of highly managed turfgrasses, such as those on golf greens. In discussing the construction and management of these root zones, he lists the following concepts as important for consideration.

- Poor root zones are characterized by:
  - diseased turf;
  - weedy turf;
  - compacted soils;
  - poorly aerated soils;
  - low soil fertility;
  - black layer.
- Intensively managed turf is characterized by:
  - heavy traffic;
  - continuous wear;
  - high irrigation.
- Intensively managed turf requires:
  - high rates of water infiltration;
  - soils resistant to compaction;
  - soils with adequate aeration.
- Root zone construction relies on exactness of design and on well drawn specifications. These are necessary for:
  - intensive use;
  - quality of play;
  - long term performance;
  - efficient water and fertilizer use.
- A soil profile with the following specifications provides a root zone with a good perched water table:
  - sand and peat moss of 10 centimeter depth;
  - sand of 20 centimeter depth;
  - coarse sand of 5 centimeter depth;
  - pea gravel of 10 centimeter depth;
  - perforated drainage pipe.

The properties of such a root zone are influenced by:
- size of particles;
- organic matter accumulation;
- turfgrass root system developed.

Particle sizes should be within the following ranges:
0.1 to 0.6 millimeters >80 percent by weight;
<0.1 millimeters <3 percent by weight;
>1.0 millimeters <3 percent by weight.
- Fineness modulus 1.5 - 2.5.
- Uniformity coefficient <4.
- Mean particle diameter 0.2-0.45 mm.

Coarse sands are droughty and unstable. Fine sands are slow to drain. Equal distribution of fine, medium and coarse sands are likely to produce a hard surface with reduced drainage. A narrow particle size range of 0.1 to 0.6 millimeters is best for turf root zones.

- From the perspective of mineralogy, sands are:
  - acid - quartz - silica;
  - alkaline - calcium carbonates, magnesium carbonates.
- Sands have limited cation exchange capacity, low nutrient reserve, poor buffering capacity and low water retention, thus 10 to 20 percent peat moss by volume is needed to amend the sand. Ten percent peat moss by volume amounts to a layer of peat moss 1 to 2 centimeters thick to be mixed into the top 10 centimeters of sand. This will increase water retention, will make the sand more resistant to compaction, and will increase resiliency.
- Natural zeolites may also be used as amendments. They have:
  - negative charge;
  - high total pore volume;
  - high internal surface.

  They have similar water infiltration and drainage characteristics as sand but will increase water retention within the root zone. Cations, such as ammonium and potassium, are held by zeolites and thus nutrient leaching losses are reduced.
- Leaching losses from sand root zones can be great, especially nitrogen.

Nitrogen Fertilizer	Percent Leaching Loss
Plant-Prod Summer Turf	15 - 20
Sulfur coated urea	10 - 15
Sewage sludge	5

Pesticide Residues in the Turfgrass Environment

Dr Gerry Stephenson
Department of Environmental Biology

Dr Gerry Stephenson is a weed scientist with specialization in pesticide chemistry, herbicide residues and movement in plants and soil at the University of Guelph. He outlines here the type of information we need to understand in order to use pesticides safely and effectively.

- 2,4-D is not a persistent pesticide in the soil. Where there is some soil warmth, the half life is two weeks or less.

- 2,4-D is not a persistent pesticide in water. There is 90 percent disappearance in less than two weeks. Decomposition takes place in sunlight.

- 2,4-D is used for control of dandelions, the seed of which may be viewed by some people as more of an environmental pollutant than the herbicide.

- The question of risk from use of pesticides is common these days. Should pesticide treated turf in parks cause them to be closed ? Should signs be placed to warn people of pesticide treatment ? Should signs be required on home lawns following use of pesticides ? In order to answer these questions, we need information on the persistence of these chemicals on turfgrasses. Do these materials rub off, scuff off, or rinse off ?

- In the laboratory, about 10 percent of that applied may be dislodged. In the field, less than one percent is dislodged by physical scuffing after 2 to 3 days, and less than 0.01 percent in a week or two. Perhaps as much as 5 to 6 percent may be dislodged on the day of application. Using a mixture of 2,4-D, MCPP and Dicamba, one percent or less is dislodged after 2 days. Granular formulations take a day to release and then the dislodged amount drops to less than one percent after 2 days.

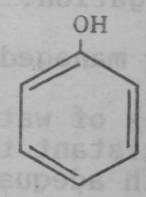
- Rain or irrigation immediately reduces the dislodgeable residue to negligible amounts even on the day of application.

- Mowing and removal of clippings gets rid of some residue, but not much.

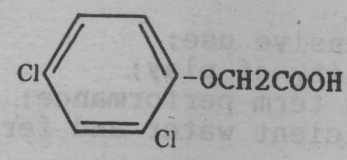
- Insecticide residues from Diazinon, Chloropyrifos and Isofenphos stay in thatch for 1 to 2 weeks but dislodgeable residues on the grass blades decrease to insignificant levels very rapidly. It is certainly a good practice for all of us to minimize our exposure to any pesticide, but there is no unacceptable risk associated with the immediate use of turf that is properly treated for pest control.

- Occupational exposure is likely to be different from bystanders exposure. The former greater than the latter.

- To the general public, the terms "pesticide" and "toxic chemical" are synonymous. However, the toxicity of common pesticides, like 2,4-D, are rarely put in perspective with other chemicals that we commonly encounter. For example, some common sore throat sprays contain 1.0 to 1.5 % phenol, a chemical with an LD50 of 100 mg/kg in test animals.



In contrast, a 2,4-D spray for the lawn contains about 0.5 % 2,4-dichlorophenoxy acetic acid



which has an LD50 of 300 mg/kg in test animals. Since the sore throat spray is approximately 3 times as concentrated and phenol is 3 times as toxic as 2,4-D, the sore throat spray is 9 times as toxic as the weed spray. People might also be surprized to learn that some of these sprays are not only good for sore throats, they can also be toxic to dandelions.

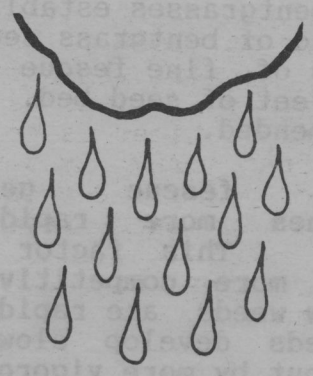
TURF EXTENSION HIGHLIGHTS OF 1989

Annette Anderson
Turfgrass Extension Specialist

Annette Anderson is Turfgrass Extension Specialist at the University of Guelph. Turfgrass concerns on golf courses, sports turf, home lawns and sod production fields are her professional responsibility. With 1988 characterized as the "Year of the Drought", 1989 became the "Year of Stress and Distress" for fine turf. 1990 will be different from the last two years, but each year of experience adds to our knowledge and understanding of those conditions that influence quality turfgrass production. Here she outlines key factors and conditions we all should be aware of.

- Pesticides:
  - Posting regulations were implemented June 2,1990.
  - Even with environmentally friendly products available, there are strong consumer concerns;
  - There are increased inquiries from the public about environmental impact of sod farms and golf courses. We need to address these concerns in future research and extension efforts.
  - These are emotional issues; they are not scientific or technological issues;
  - Turfgrass is an environmentally friendly commodity; it must be recognized for what it is, not for what some think it is.

- Water:
  - Water quality and quantity are a future concern. In some areas of Ontario there are watering restrictions and/or bans which have had a significant effect on the green industry.
  - Brown is not as nice as green;
  - After 2 1/2 months of watering bans in some areas, the level of hysteria regarding the survival of home lawns was interesting to observe.



  - Some would give up on lawns and substitute inert materials; surely there is a better way to deal with this issue. We have to promote good cultural practices, low maintenance grasses, etc.

- The 1989 Growth Season;
  - Season made a slow start;
  - Winter injury was evident;
  - Environmental stresses had their effect - poor root growth, poor germination;
  - Not so much disease early;
  - Saturated root zones - cool and wet conditions;
  - Physical wear problems developed;
  - A lot of mowing was required when growth finally started;
  - Leaf spot - Helminthosporium infection caught on;
  - Got too much shoot growth from early spring fertilization;
  - Then, red thread, mushrooms, slime mold and patch diseases hit Kentucky bluegrasses; infection took place earlier than the symptoms were noted; necrotic ring spot or summer patch, European chafer, grubs were noted; turfgrass scale [affects spring green-up], bluegrass bill bug, sod webworms all called for the turf managers' attention;
  - Control of thatch and annual bluegrass were high on the adjusted cultural practices list;
  - Crabgrass problems persist;
  - Fertilizer burn was evident; more attention is needed in the selection of nitrogen carriers;
  - Integrated Pest Management requires more emphasis; this involves records of insects and weeds and also climatic data. In 1989 and 1990, we are monitoring sites on a weekly basis and using disease detection kits and environmental monitoring and analytic systems to help forecast disease and insect problems;

- Office Development:
  - A Turf Hot Line was started with weekly 3 minute recordings;
  - Soil testing is now available from three private labs in Ontario that have been accredited by the Ministry of Agriculture and Food;
  - Fields Days and Demonstrations are scheduled.
  - GTI 3rd Annual Educational Symposium, November 5,1990. Theme: Turfgrass and the Environment.

PERFORMANCE OF NEW VARIETIES ... OF TURFGRASS

Norm McCollum
Department of Horticultural Science

Norman McCollum, also known as "Mister Turf" is Superintendent of turf plots at the University of Guelph. Variety trials and evaluations are conducted there as part of the research program directed by Dr Ken Carey and Dr Jack Eggens. This excellent facility will now be relocated from Cambridge to an even better site adjacent to the Arboretum at the University. Norm often says of cultivar evaluations, "where ever there is a plus factor, there is also a minus factor". He has listed the following factors as important in fine turf evaluation.

- When planting tall fescues during cooler times of the year, add fine fescue - Chewings has looked particularly good. Use 25 to 30 percent by weight.

- Seed mixtures should not contain more than 15 to 20 percent turf type perennial ryegrasses. If use more than this, the ryegrass is so competitive that 100 percent ryegrass might as well be planted.

- With Kentucky bluegrass cultivar evaluations, late fall color and early spring green-up are important. Banff and Midnight Kentucky bluegrass look good.

- Evaluations for color include the following grasses as best:

- Midnight	Gator
Ram I	Majestic
Nassau	Alpine
Fiesta II	Gnome
America	Baron
Barblue	

- Evaluations for overall appearance include the following grasses as best:

- Touchdown	Banff
Barblue	A-34 Benson
Yorktown II	Palmer
America	Fiesta II
Gator	Haga
Midnight	Gnome

- Evaluations for weed-free condition include the following grasses as best:

- Palmer	Gator
Fiesta II	Julia
Yorktown II	Banff
Touchdown	A-34 Bensun
Fylking	Sydsport
Ram I	

- With perennial ryegrasses, mowing three times a week helps to keep them looking good. The seeding rate must be right - not too much or too little. Palmer, Fiesta II and Yorktown II can be mown in 10 days. In many respects, ryegrass grows too fast. A little extra nitrogen is the best control for rust.

- Fine fescues grow well in the shade and tolerate close mowing. They have drought tolerance but not as good heat tolerance. Overall they are a friendly species that can enhance any mixture of grasses. They are not aggressive and allow the expression of other grasses.

- Tall fescues should not carry this name. They can tolerate clipping as low as one inch. They are deep-rooted, can grow in gravel, are drought tolerant and should be considered a low energy input turf species. They respond well to nitrogen. The new releases are worth looking at. Houndog is hardy as far north as Saskatoon. Rebel II looks good for sod production. Some of the newer releases may be even better.

- The National Turfgrass Testing Trials often report results as overall averages. These mean little, as over wide geographic areas, meaningful differences average out and are non-existent. Look at test data from trials close to home.

- Seeded bentgrasses establish better when 1/2 pound of bentgrass seed is mixed with 3 pounds of fine fescue seed per 1,000 square feet of seed bed. Chewings fescue is recommended.

- Chewings fescue germinates and establishes more rapidly than hard fescues. This factor makes Chewings fescues more competitive with weeds. Some few weeds are rapid in development; most weeds develop slowly and can be crowded out by more vigorous turfgrasses.

Reduction of Annual Bluegrass in Golf Course Fairways

Dr Ken Carey
Department of Horticultural Science

Dr Ken Carey is a Research Associate with Dr Jack Eggens, specializing in variety trial research that concerns establishment of seed and sod and the physiology of plant competition. Here he reports on competition among bentgrasses and annual bluegrasses. In this instance, annual bluegrass is treated as a weed component of the sward.

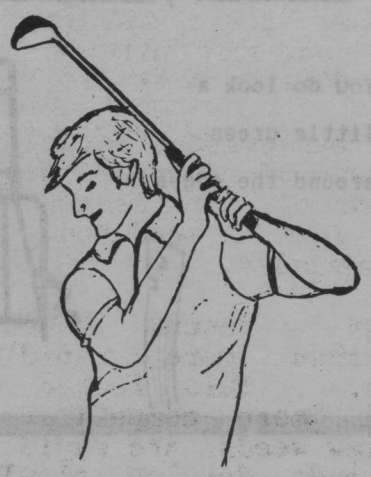
- Annual bluegrass is characterized by:
  - poor high temperature tolerance;
  - poor low temperature tolerance;
  - poor appearance with other grasses [yellow color];
  - poor wear tolerance [low structural strength];
  - produces seedheads at low mowing to make poor playing characteristics.

- Two management options are available:
  - maintain it;
  - remove it from Kentucky bluegrass, creeping bentgrass or perennial ryegrass turf.

- Cultural approach involves selective adjustment of:
  - mowing height;
  - core cultivation;
  - irrigation;
  - fertility.

- Chemical approach involves the use of selective growth regulators and herbicides.

- View turfgrass as a type of ecosystem rather than as a crop.



Favor Annual Bluegrass	Favor Creeping Bentgrass
Mowing	
Low - 20-25 mm [1 inch]	Low 3-10 mm [1/8 -2/5 inch]
Clipping Removal	
No	Yes
Nitrogen	
High 2-3 kg per 100 sq meters [2 to 3 pounds per 1000 square ft]	Moderate 0.5-1.0 kg per 100 sq meters [0.5 to 1.0 pounds per 1000 square ft]
Water	
Generous with good drainage especially in winter	Moderate with good drainage
Core Cultivation	
Yes [when seed germination] No [when soil is compacted]	Yes
Traffic	
Yes	No

- In order to control annual bluegrass, the following check list should be used regularly and data recorded:
  - botanical composition of turf [amount of bentgrass; amount of annual bluegrass];
  - wear tolerance of grasses - measure of recuperative potential;
  - measure of thatch formation;
  - measure of soil compaction;
  - soil nitrate and ammonia tests;
  - measure of nitrogen uptake - tissue tests;
  - turf functional features, such as density.

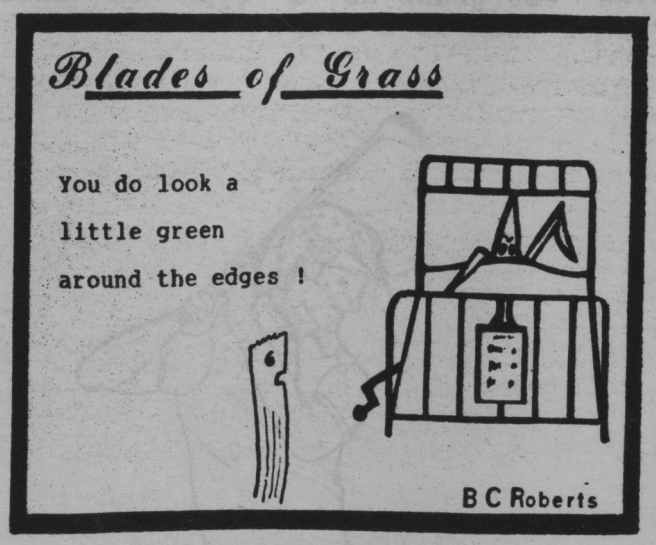
NEW DEVELOPMENTS IN DISEASE DIAGNOSIS AND MANAGEMENT

Dr Lee Burpee
Department of Environmental Biology

Dr Lee Burpee is a specialist in turfgrass disease diagnosis and management at the University of Guelph. Summer patch and take-all-patch have attracted his attention in Southern Ontario in recent months. Here he outlines recent research information on these turfgrass diseases.

- Summer patch is caused by Magnaporthe poeae. The fungus causes root damage when soil temperatures are high.
  - Ambient temperature of 30 degrees Centigrade [86 degrees Fahrenheit];
  - Soil temperature of > 25 degrees Centigrade [77 degrees Fahrenheit].
  - Soils must be moist - absence of good drying conditions.
  - Kentucky bluegrass and annual bluegrasss are both susceptible.
  - The fungus spreads through the soil not in the turf.
  - Creeping bentgrasses often come in where annual bluegrass is diseased.
  - Foliage at edges of dead areas have yellowing leaf tips - indicative of some malfunction in the roots.
  - Roots are discolored - dark brown. They do not absorb water or nutrients. They are not rotted, just discolored. Fungus hyphae can be seen.
  - Cultural control - hold off on nitrogen until late May or early June so as to let roots grow. Aerify in September and again in early May before annual bluegrass seedheads form. During late June, July and August syringe with small amounts of water.
  - Chemical control has been obtained best with 4 to 8 ounces of fungicide containing benomyl or thiophanate-methyl used as a drench.
  - Generally perennial ryegrass and creeping bentgrass are considered resistant.
- Take-all-patch is caused by Gaeumannomyces graminis. The fungus attacks roots in cool moist soil. Infected plants are less tolerant during drought stress. Above ground symptoms can be seen in late spring.
  - When soil pH is 7 or higher the disease is more of a problem.
  - Only bentgrass is highly susceptible.
  - Thus talk-all-patch is the opposite of summer patch which may kill all the annual bluegrass and leave the bentgrass.
  - Patches are larger than those of summer patch.
  - The tips of leaves become yellow. The root system stays intact but becomes dark brown. There is not much root rot but roots become full of fungus and fail to function properly.
  - This condition may be confused with localized dry spot.
  - Cultural control - the disease takes place at high soil pH. Decrease soil pH to about 6.0 or less. In using sulfur soil bacteria must convert it to sulfate. Ammonium sulfate can be used as a nitrogen source except in the heat of summer.
  - Chemical control has not worked very well. PMAS drench has been best to date. Top dressing with low pH sands has helped some where greens have sand root zones with pH greater than 7.

Editors Note: Dr Lee Burpee is now Turfgrass Pathologist at the University of Georgia Field Station located in Griffin Georgia.

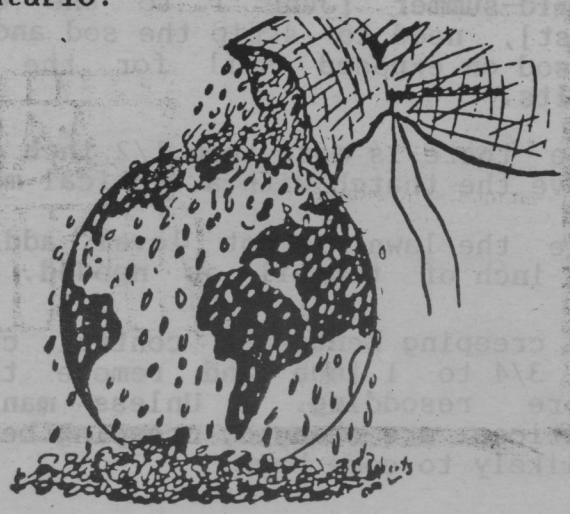


TURFGRASS SEED PRODUCTION IN ONTARIO

Dr Ed Gamble
Department of Crop Science

Dr Ed Gamble is a plant breeder with interest in turfgrass genetics and breeding at the University of Guelph. In addition, he is conducting research on turfgrass seed production in Ontario. The following observations are of interest.

- Perennial ryegrass seed yields have varied from 950 to 1100 kilograms per hectare [848 to 1081 pounds per acre] in 1988 and 1989. There are 175 to 200 hectare [420 to 480 acres] in seed production in Ontario.
- Perennial ryegrass seed production may be considered an alternative crop for tobacco in Ontario.
- On sand ridge, the ryegrass is damaged by sand burn in the winter when there is a lack of snow.
- Imports of turfgrass seed into Canada are significant each year. The total bentgrass, bluegrass, fescue, red top and ryegrass seed imported in 1988-1989 was 7,111,800 kilograms [15,645,960 pounds]. The five year average was 5,763,200 kilograms [12,679,040 pounds].
- Why produce turfgrass seed in Ontario ?
  - need to maintain the seed supply;
  - field burning issue in the Pacific Northwest;
  - acreage availability in the Pacific Northwest is limited for turfgrass seed production;
  - transportation costs;
  - competitive yields in Ontario;
  - high quality seed can be produced in Ontario.



- He concluded that Ontario is a possible new site for turfgrass seed production.
- Why does the Ontario seed producer look at this new potential for turf seed production ?
  - Consider it to have a high economic return to the producer;
  - Fits well into a cash crop rotation;
  - Is excellent for rebuilding soil structure;
  - Excellent for minimizing soil erosion by wind and water;
  - Has a reduced labor input.
- What are the disadvantages to turfgrass seed production in Ontario ?
  - Production technology is lacking;
  - Limited research funding;
  - Need market development;
  - There is a lack of Canadian varieties - need variety development;
  - Need research on seeding rate, row width, nitrogen management and timing of applications and how to deal with ice some winters.
- Research to date indicates:
  - A nitrogen rate of application of 90 to 120 kilogram per hectare [80 to 107 pounds per acre] produced high seed yields;
  - Row widths of 18 to 36 centimeters [7 to 14 inches] and a seeding rate of 4 kilograms per hectare [3.5 pounds per acre] were optimum.
  - Fungicide treatment increased yields one year in which a heavy crown rust incidence occurred.
  - The best method of seed harvest is under investigation. In Ontario, the seed is not left swathed beyond 4 or 5 days in the field. There is a need to determine the optimum seed moisture content for swathing and direct combine harvest to minimize seed shed.
  - Seed shed at, or prior to, harvest can thicken the stand and reduce seed yield.
  - Certified seed of perennial ryegrass can be grown from the same stand for 3 years but shed seedlings must be controlled each year to maintain seed yield.
  - No burning of fields will be practiced in Ontario.
  - Trials with turf type tall fescue, Kentucky bluegrass and bentgrass are under way.
  - There are no plant breeder's rights in Canada. However, legislation was passed in Parliament May 7,1990. It now must be passed by the Senate before becoming law.

NEW TECHNIQUES FOR ESTABLISHING TURFGRASS SOD

Dr Jack Eggens
Department of Horticultural Science

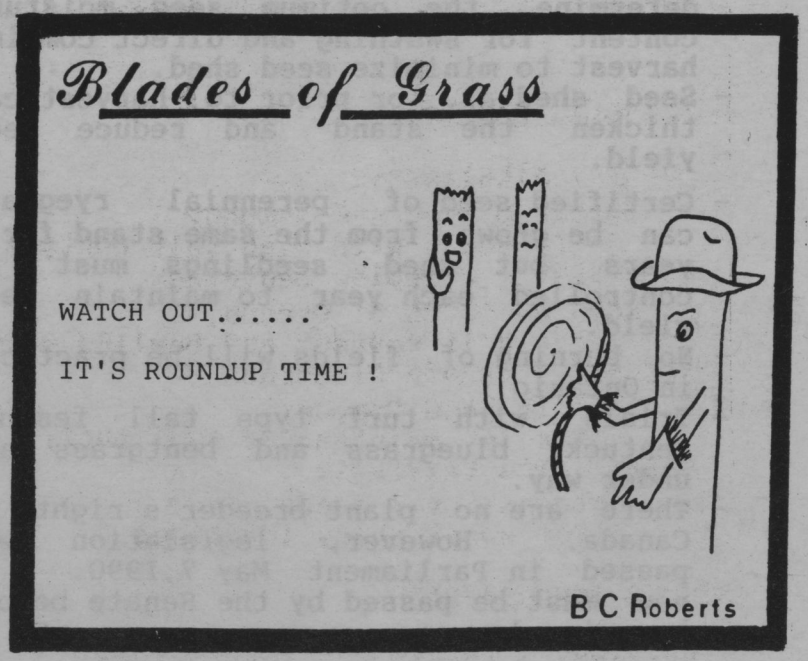
Dr Jack Eggens is project leader for establishment and management turfgrass research at the University of Guelph. He and Dr Ken Carey are concerned with both seed and sod. Recent research results have application mainly for home lawns, parks, and other low maintenance turf. Emphasis should be placed on the following points.

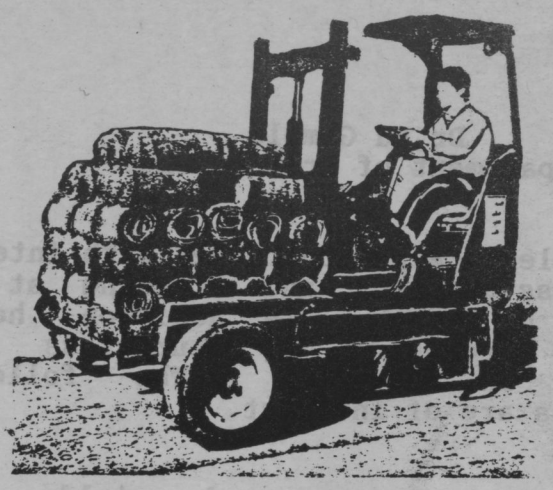
- In the establishment of seed and sod, stress makes the difference between success and failure.

- Site preparation for the establishment of seed or sod is particularly important.

- Three grasses present problems:
  - tall fescue;
  - crabgrass;
  - creeping bentgrass.

  Kill out these grasses with glyphosate [Roundup ®] and seed or sod. Find that 10 to 14 days is needed in the fall and 3 to 4 weeks in the spring for the weeds to be eliminated. A slit seeder may be used where annual bluegrasss is not a problem.





- When glyphosate is used in the fall to kill all vegetation, what are the options for turf establishment:
  - sod over the dead sod without removal;
  - dead sod stripped with a sod cutter and sod laid;
  - area rototilled to a 5 inch depth and the site leveled;
  - dead sod verticut to 2 inch depth;
  - one quarter of an inch of topsoil added over the dead sod.

- The amount of thatch makes a difference. The less thatch, the better [not more than 1/2 inch].

- Creeping bentgrass often comes back into the new sod if kill is not complete.

- Tall fescue does not come through as easily as bentgrass.

- In cool seasons of the year, to mid-May and from the first week in September on through the fall, all the above procedures should give good results.

- In mid-summer [June 1 to the end of August], need to strip the sod and place new sod on exposed soil for the best results.

- Where there is more than 1/2 inch of mat, remove the thatch with a vertical mower.

- Where the lawn is not level, add 1/8 to 1/4 inch of topsoil as needed.

- For creeping bentgrass control, cut the sod 3/4 to 1 inch and remove the sod before resodding. Unless management practices are changed, creeping bentgrass is likely to come back.

1990-1991 Variety Review Board

Recognized Cultivars

Each year The Lawn Institute's Variety Review Board selects cultivars which have special characteristics. The list for 1990-1991 with their sponsoring firm:

BLUEGRASSES:

A-34 BENSUN	Warren's Turf Prof
ADELPHI	J & L Adikes Inc
AMERICA	Pickseed West Inc
ARBORETUM	Mangelsdorf Seed Co
BARON	Loft's Inc
CLASSIC	Peterson Seed Company
ECLIPSE	Turf Cultivars Asso
ESTATE	Agway/Roberts Seeds
FREEDOM	Jacklin Seed Company
FYLKING	Jacklin Seed Company
GLADE	Jacklin Seed Company
GNOME	Turf Merchants Inc
HUNTSVILLE	Jacklin Seed Company
LIBERTY	Zajac Performance Seeds
MERIT	Full Circle Inc
MONOPOLY	Peterson Seed Company
NASSAU	Jacklin Seed Company
NUGGET	Pickseed West Inc
RAM I	Loft's Inc
RUGBY	Seed Prod & Intro Corp
TOUCHDOWN	Pickseed West Inc

FINE FESCUES:

BANNER - Chewings type
- E F Burlingham & Sons
CINDY - red fescue -International Seeds Inc
JAMESTOWN - Chewings type - Loft's Inc
KOKET - Chewings type
- E F Burlingham & Sons
RELIANT - hard fescue - Loft's Inc
SR 3000 - hard fescue
- Seed Research of Oregon
VALDA - hard fescue - International Seeds

TURF TYPE PERENNIAL RYEGRASSES:

ALL*STAR	J & L Adikes Inc
DERBY	International Seeds Inc
ELKA	International Seeds Inc
FIESTA II	Pickseed West Inc
GATOR	International Seeds Inc
LINDSAY	International Seeds Inc
MANHATTAN II	Turf Merchants Inc
PENNANT	E F Burlingham & Sons
PENNFINE	Seed Prod & Intro Corp
RANGER	Van Der Have of Oregon
REGAL	International Seeds Inc
SR 4000	Seed Research of OR
TROUBADOUR	International Seeds Inc

TURF TYPE TALL FESCUES:

ARID	Jacklin Seed Company
ERA	International Seeds Inc
FALCON	E F Burlingham & Sons
GALA	International Seeds Inc
HOUNDOG	International Seeds, Inc
MIRAGE	International Seeds Inc
MUSTANG	Pickseed West, Inc
REBEL II	Loft's Inc
TITAN	Seed Research of Oregon

COLONIAL BENTGRASS:

EXETER - colonial - Pickseed West, Inc

SPECIALTY GRASSES:

FULTS - Alkaligrass
- Northrup King and Company
- For soils with high salt content;
PROMINENT - Creeping bentgrass
- Seed Research of Oregon,
- For golf courses and bowling greens;
REUBENS - Canada bluegrass
- Jacklin Seed Company
- For low maintenance semi-turf;
SABRE - Poa trivialis
- International Seeds, Inc;
- For moist shady locations.

SEEDED BERMUDAGRASS:

CHEYENNE - Pennington Enterprises

The Lawn Industry in America

by

Dr Joseph E Howland
University of Nevada

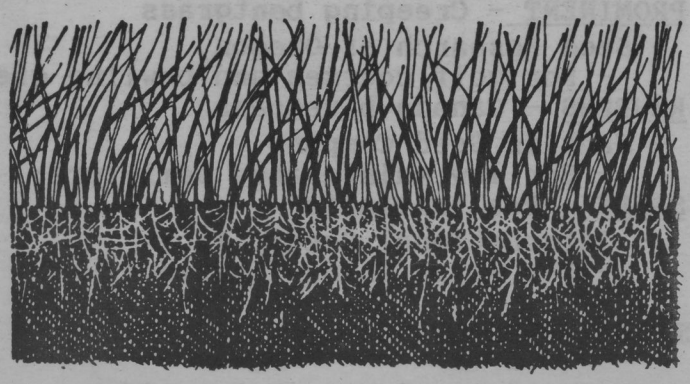
"Mowed lawns as we know them began with the invention of the reel mower in the early 1820s by Budding in England. By the 1980s, lawnmowers were staples in America as Downing's books on home landscaping became popular. Power mowers began to appear in the early 1900s, with the LOCKE mower name soon established as the PENNSYLVANIA name for push mower.

I "inherited" the job of home lawn care at age 10. My father was in the automobile business, had his shop men jury-rig an old Smith MotorWheel to power our old 21-inch Pennsylvania mower. That served me until my 4-H Club experience introduced me to Dr Jess DeFrance and his turf research plots at Rhode Island State College, the oldest in America.

My next lawn experience came when I was assigned to maintain the Hort Gardens and their many wide turf paths at Michigan State College. My own first lawn was in Des Moines, Iowa, about 5,000 sq ft of turf at our home there when I was Associate Editor of Better Homes and Gardens. I discovered the problems of excessive summer heat and humidity week after week.

We ordered a house built in Stamford, Connecticut, seeded almost 10,000 sq ft with Scotts Bluegrass Mix. I was then Garden Editor of House Beautiful magazine building eight lawns each year for the eight PACESETTER HOMES we built in different parts of the country each year for eight years.

Then I joined Scotts to edit Lawn Care for the next 12 years. We built again, this time in New Canaan, Connecticut, with 30,000 sq ft sodded with WINDSOR bluegrass, the first in New England.



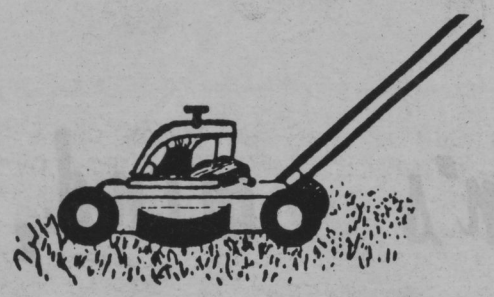
The lawn industry had "blossomed" in the '20s with the introduction of VIGORO by Swift & Company, the Chicago meat packers, a meatscrap-based fertilizer, and by the decision of Charles Mills of the Scott Farm Seed Company in Marysville, Ohio to create a Lawn Seed Division, selling bluegrass seed collected from the floors of hay barns across the Midwest. At first it was sold door to door but quickly became a mailorder seed business, O M Scott & Sons, publicized by mailing an advisory/reminder bulletin called Lawn Care four times a year to anyone interested in lawns. Mills soon established a reputation for LAWN CARE that saw it used as a textbook in agricultural colleges across America. Lawn Care lasted for more than 50 years, eventually reaching, during my 12 years as its Editor, a circulation of 9,000,000 copies at each mailing, enough to give the small town of Marysville, Ohio a postoffice officially listed as Class I size.

Meantime, Mills captured the bentgrass market, selling railroad cars of sprigs to plant estates and golf courses across the Eastern United States, spurred on by his World War I observations in Europe that led him to believe golf would become popular in the United States. And, with the readily observed demand of owners of home lawns for VIGORO, he created and introduced Scotts TURF BUILDER.

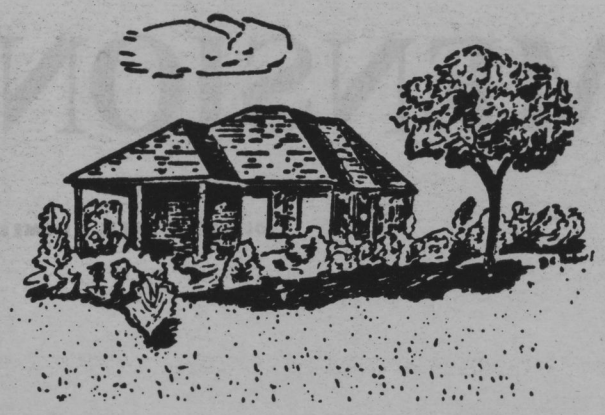
THE LAWN INDUSTRY CONTINUED

The lawn industry really "took off" after World War II when FHA loans doubled the percentage of owned homes in America, each with the need for a lawn and lawn care. The "Levittowns" of America and the eager new homeowners soon tired of being a slave to the lawn, and eagerly bought worksaver, inexpensive power mowers and lawn sprinkler systems that appeared on the market. "I hate Crabgrass !" soon became such a universal comment that Johnny Carson seldom let a week go by in those days without a crabgrass joke.

The post-war inexpensive power mower likely had as much to do with the spread of lawnmania in America as anything. The end of World War-II found Italy with enormous leftover war-time capacity for building small gasoline engines: Italy's answer was the VESPA Motor Scooter, America's was the small home power mower, the perfect answer for the returning veteran with a lawn to mow and a memory that overseas he didn't do anything a little gasoline engine could do instead.



Those first post-war lawns were seeded. I remember moving to Reno, Nevada to find that sodded lawns were unknown. At Scotts, I had worked with the fledgling sod industry in Colorado, and in California. I ordered a load of WINDSOR sod from California's pioneer sod grower, Cal-Turf at Patterson, California. Today, Reno, like most thriving cities, has nearby sod farms as well as the imported loads. And, no longer is there customer surprise when told new-lawn costs the same, seeded or sodded, as so many landscape contractors now quote. America loves its lawns, as overseas visitors are quick to note "as so American !"



Scotts did not grow its own grass seed. Until the discovery of MERION bluegrass at the Merion Country Club in Pennsylvania, all grass seed for lawns was produced as an alternate to harvesting grass areas as pasture or hay. Merion quickly became the bluegrass in America. Mills, joined by Paul Williams and Victor Renner, searched for their own bluegrass. They found it in WINDSOR, a lawn grass so superior it was granted a U S Patent, the first grass ever granted a U S Patent. Today there are dozens of superior bluegrasses on the market, each chosen for some special lawn need.

RESEARCH REPORTS

USE OF MEFLUIDIDE FOR TURF OVERSEEDING

J L Eggens, C P M Wright and K Carey
HortScience
Volume 24 Number 2
Pages 300-301
1989

The introduction of overseeded grasses into a predominantly annual bluegrass fairway has not usually been successful due to competition from the existing annual bluegrass community. In turfgrass communities, the competition pressure results primarily from shading and the limited capacity of the developing seedling root system to compete effectively for finite nutrient and water resources. Similar effects have been noted in mixed grass and herbaceous broadleaf communities.

In high-quality turf areas, preemergence and postemergence herbicides have been used to adjust competition in the existing plant community in favor of desirable species and in some cases to increase the rate of success of overseeding or plugging. However, use of herbicides in conjunction with overseeding has been less than completely satisfactory due to variable control, phytotoxicity to established and desirable species, and residues that can decrease overseeding success.

In cool-season turfgrasses, including annual bluegrass, mefluidide has been used for height control and seedhead suppression. For annual bluegrass, there is less information available on the effects of mefluidide on growth than on seedhead suppression.

Research at the University of Guelph has had the objective to evaluate the use of mefluidide to suppress annual bluegrass turf and to increase the success of overseeding. Best success would involve both improving the overseeding and keeping the established turf functional; for example, keeping a golf fairway in play.

In pot culture, mefluidide caused a significant reduction in shoot and root dry weight and tiller number of single annual bluegrass plants and of annual bluegrass planted at high densities. In the latter case, mefluidide also increased the success of Penncross creeping bentgrass overseeded into the annual bluegrass.

Overseeding success of Fiesta perennial ryegrass in field trials increased significantly with increasing rates of mefluidide. No increase in success was noted in overseeding with creeping bentgrass in the field. There was a minimum detrimental effect of mefluidide to turf quality of the established turf species in the golf course fairway.

TOLERANCE OF FIVE PERENNIAL COOL-SEASON GRASSES TO FLUAZIFOP

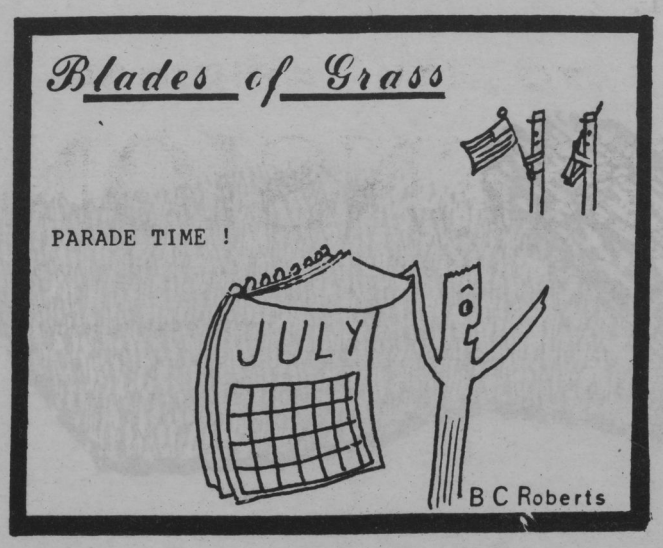
S L Warren, W A Skroch, T J Monaco and J M Shribbs
Weed Technology
Volume 3 Number 2
Pages 385-388
1989

Growth of woody plants have shown that cool-season perennial grasses interfere by competing, mainly, for water and nitrogen. Thus, to maximize woody plant growth, grasses near them need to be controlled. However, in the Appalachian region of the southern United States, growers are encouraged to maintain a sod interrow to minimize soil erosion and to improve trafficability. Frequent mowing during the growing season is a major means of suppressing sod growth. Development of an economical and effective chemical sod suppressant could reduce frequency of mowing, thereby decreasing the grower's production costs.

Fluazifop, a selective postemergence herbicide, controls a range of annual and perennial grasses. Early reports indicated that the efficacy of fluazifop appeared to be independent of the growth stage. However, subsequent studies have shown that growth stage does affect the response of some grasses to fluazifop. In general, grass tolerance increases with increasing size. This response may be related to species, environmental conditions and application rate. Tall fescue and perennial ryegrass respond similarly, but the data with these species and other cool-season perennial grasses are limited.

Based on the need to control cool-season perennial grasses and the potential value of a chemical sod suppressant in woody crop production, this research at North Carolina State University was initiated to determine the effect of growth stage and herbicide rate on the response of Kentucky bluegrass, creeping red fescue, tall fescue, orchardgrass and perennial ryegrass treated at the 2 to 3 leaf, 3 to 4 leaf, 4 to 6 leaf and 6 to 7 leaf growth stage with the butyl ester of fluazifop at 0, 0.14, 0.28 and 0.56 kilogram active ingredient per hectare [0, 0,12, 0.24 and 0.48 pound active ingredient per acre].

Creeping red fescue was not injured by any rate at any growth stage. Reduction in shoot dry weight increased linearly with increasing fluazifop rate for the remaining four species, except for the 6 to 7 leaf stage in Kentucky bluegrass and the 4 to 6 leaf stage in tall fescue and perennial ryegrass. Significant differences between growth stages within each rate varied with species. In general, tolerance increased at the 4 to 6 leaf and 6 to 7 leaf growth stages.



AN OBEISANCE TO GRASS

Of all that lives and grows
  Most humble is the grass.
High pride is in the rose
  And vanities that pass
Are clothed in arrogance.
But grass is meek. The strong
  Need pride nor arrogance.
As blood is in the heart,
As strength is in the sea,
  So grass is in the earth,
And sings as bright a song -
  As pure and humble mirth
As sings in blood the heart,
  As sings in strength the sea.

For grass is sea and sun,
  Is dust of earth in song,
Is blood in vein and bone,
  Most humble and most strong.

- John Howland Beaumont

Warm Season Grasses

RESPONSE OF CENTIPEDEGRASS TO PLANT GROWTH REGULATORS AND FREQUENCY OF MOWING

B J Johnson
Weed Technology
Volume 3 Number 1
Pages 48-53
1989

Centipedegrass is a low maintenance turfgrass adapted to the southeastern United States. Under low fertilization, centipedegrass requires only infrequent mowing during the spring and early summer to maintain acceptable quality. Because of prolific seedhead production of centipedegrass during mid-summer to early fall, frequent mowing is necessary to eliminate seedheads, thereby maintaining a quality turf. Therefore, if plant growth regulators were effective in suppressing centipedegrass seedheads, the number of mowings could be reduced.

Because no information on the response of centipedegrass to plant growth regulators was available, experiments were initiated at the University of Georgia to determine the effects of plant growth regulators on seedhead suppression, injury and vegetative growth and to determine whether mowing is needed with plant growth regulator treatments to obtain acceptable full-season seedhead control.

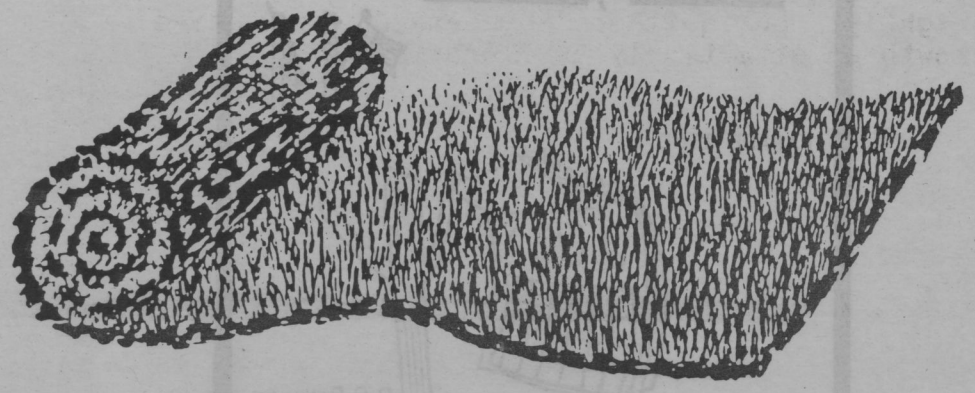
When centipedegrass was unmowed, seedhead suppression generally was better with imazethapyr than with mefluidide, either alone or with flurprimidol, but these treatments were not effective for 8 weeks. In several instances, imazethapyr applied at 0.30 kilogram active ingredient per hectare [0.26 pound active ingredient per acre] and MH at 2.2 and 4.5 kilogram active ingredient per hectare [2 and 4 pound active ingredient per acre] severely injured [greater than 30 percent] centipedegrasss. Mowing weekly did not control seedhead development effectively, and none of the plant growth regulator plus mowing treatments effectively suppressed seedheads for 12 weeks. To effectively suppress seedhead production for 8 weeks, centipedegrass treated with mefluidide required mowing 3 weeks after treatment, while centipedegrass treated with imazethapyr or flurprimidol plus mefluidide required mowing at 3 and 6 weeks.

HERBICIDE EFFECTS ON TENSILE STRENGTH AND ROOTING OF BERMUDAGRASS SOD

S S Sharpe, R Dickens and D L Turner
Weed Technology
Volume 3 Number 2
Pages 353-357
1989

High quality sod is the desired product of commercial sod production. Quality factors include: appearance, handling ease during harvesting and installing, and rapid establishment. Weeds reduce the quality of sod and are controlled most frequently with herbicides. The effects of many of these herbicides on growth, development and subsequent survival of bermudagrass sod are not known. The objective of this study conducted at Auburn University was to determine how selected herbicides affect sod tensile strength and rooting of mature and immature turfs of Tifway bermudagrass. Both immature and mature turf had 100 percent ground cover, but only mature turf had tensile strength adequate for harvesting and handling.

Sod tensile strength at 2, 4 and 8 weeks after application generally was unaffected by herbicide treatment, although imazapyr killed bermudagrass top growth. Root number and root length initially were depressed by imazapyr, bensulide, napropamide, sethoxydim and sulfometuron at most rates and intervals tested. Eight weeks after treatment, root length, root number, and sod tensile strength for all treatments except those with imazapyr were similar to that of the untreated control.



THRESHING THE JOURNALS continued

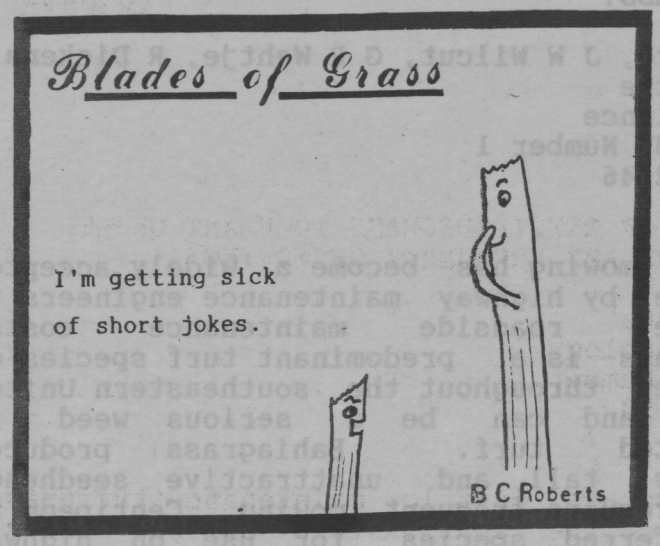
RESPONSE OF BERMUDAGRASS TO PLANT GROWTH REGULATORS

B J Johnson
Weed Technology
Volume 3 Number 3
Pages 440-444
1989

Maintenance of quality turfgrass requires a good management program. This includes correct choice and timing of fertilizer and herbicide applications along with regular mowing. Mowing is a time consuming, costly, and often dangerous maintenance procedure. Because some plant growth regulators suppress vertical shoot growth of turfgrasses, they can significantly reduce the number of required mowings. Experiments at the University of Georgia have been initiated to determine the influence of several plant growth regulators on injury, quality, vertical growth and seedhead suppression of common and Tifway bermudagrasses.

The vegetative growth of mowed Tifway bermudagrass was suppressed 15 to 22 percent for 3 weeks by flurprimidol applied at 0.84 kilogram active ingredient per hectare [0.75 pound active ingredient per acre] while mowed common bermudagrass was suppressed 30 to 34 percent during the same period by flurprimidol applied at 1.1 kilogram per hectare [1 pound per acre]. When nonmowed bermudagrass was treated with flurprimidol, the growth of Tifway treated at 0.84 kilogram per hectare [0.75 pound per acre] was suppressed 42 percent at 8 weeks, while growth of common bermudagrass treated at 1.1 kilogram per hectare [1 pound per acre] was suppressed 26 percent at 6 weeks. Excessive injury by flurprimidol occurred when common and Tifway bermudagrass were treated at rates above 1.1 and 0.84 kilogram per hectare [1 and 0.75 pound per acre] respectively.

Imazethapyr excessively injured both bermudagrass cultivars. Mefluidide and Mon-4620 injured both bermudagrass cultivars slightly, but neither suppressed vegetative growth as effectively as flurprimidol.



SULFOMETURON FOR ELIMINATING BAHIAGRASS FROM CENTIPEDEGRASS AND BERMUDAGRASS

W W Hanna, C W Swann, I Schroeder & P R Utley
Weed Technology
Volume 3 Number 3
Pages 509-512
1989

Bahiagrass is a major weed in centipedegrass and bermudagrass turf and in improved hybrid forage bermudagrass pastures. Prolific seedhead formation, height and coarseness of bahiagrass make it objectionable in turf. The weed potential of bahiagrass by seed dissemination through animal feces and its low forage yield, make it undesirable in improved bermudagrass pastures. Although a few herbicides are registered for bahiagrass control, no herbicide is available to selectively control bahiagrass in bermudagrass or centipedegrass without injuring the desired turf or forage. This study was conducted at the University of Georgia to determine if Pensacola bahiagrass could be selectively eliminated from centipedegrass and Tifway bermudagrass turf and a Coastal bermudagrass pasture by treating with sulfomethuron.

Established Pensacola bahiagrass usually was controlled satisfactorily in Tifway bermudagrass and centipedegrass turf and in a Coastal bermudagrass pasture with sulfometuron at 210, 160, 105 grams active ingredient per hectare [0.18, 0.14 and 0.10 pounds active ingredient per acre] applied twice respectively. Bahiagrass seedlings were eliminated from both newly planted centipedegrass and Tifway bermudagrass turf with 105 gram per hectare [0.1 pound per acre] sulfometuron applied once.

THREADING THE JOURNALS continued

ABSORPTION, TRANSLOCATION, AND METABOLISM OF SULFOMETURON IN CENTIPEDEGRASS AND BAHIAGRASS.

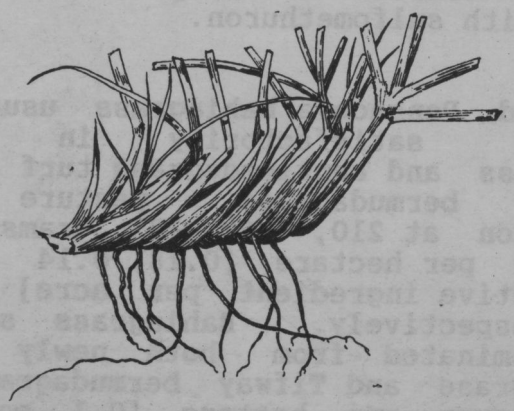
J H Baird, J W Wilcut, G R Wehtje, R Dickens & S Sharpe
Weed Science
Volume 37 Number 1
Pages 42-46
1989

Reduced mowing has become a widely accepted practice by highway maintenance engineers to minimize roadside maintenance costs. Bahiagrass is a predominant turf species on roadsides throughout the southeastern United States and can be a serious weed in cultivated turf. Bahiagrass produces numerous tall and unattractive seedheads which require frequent mowing. Centipede is a preferred species for use on highway roadsides because it has a low growth habit and does not produce unsightly seedheads, thus reducing the need for mowing.

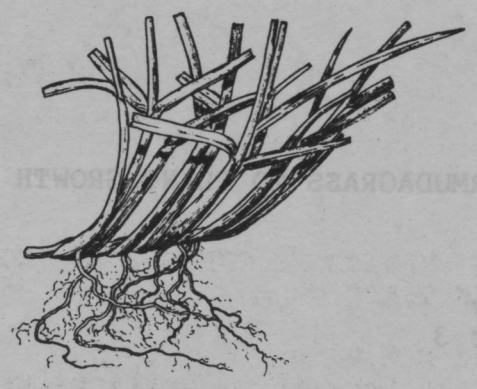
Some of the advantages of centipedegrass are that it:

- grows well in acidic soils and tolerates low fertility;
- spreads vegetatively from stolons;
- tolerates low and high temperature stress and periods of drought;
- provides year-round erosion protection.

However, centipedegrasss is slow to establish. Consequently, more competitive weedy grasses, such as bahiagrass, become established in a centipedegrass sward and must be eliminated. Currently, there is little information on herbicides that will selectively remove bahiagrass from centipedegrass, or on growth regulators that will suppress seedhead development in bahiagrass. Therefore, there is a need for an herbicide that will suppress bahiagrass seedhead production and/or provide selective control in centipedegrasss.



Bahiagrass (Paspalum notatum)



Centipedegrass (Eremochloa ophiuroides)

Sulfometuron, a sulfonylurea herbicide, has demonstrated broad-spectrum weed control with both preemergence and postemergence application. It is currently registered for roadside vegetation control. At certain doses, sulfometuron has shown potential for the control of seedhead suppression of bahiagrass infestations in centipedegrass.

The primary mode of action of sulfonylurea herbicides is inhibition of the enzyme acetolactate syntheses, which catalyzes the first common step in the biosynthesis of branched-chain amino acids valine, leucine, and isoleucine. The selectivity of different sulfonylurea herbicides is based on differential rates of herbicide metabolism in susceptible and tolerant species.

The objectives of this research at Auburn University were to investigate the absorption, translocation and metabolism of sulfometuron in centipedegrass and bahiagrass as possible explanations for the selectivity differences between these species, and to evaluate the response of these species to sulfometuron when applied only to the soil and/or foliage.

Sulfometuron, when applied as a foliar and/or soil application, prevented regrowth of bahiagrass. Sulfometuron application did not reduce regrowth of centipedegrass regardless of method of application. Sulfometuron was absorbed by the roots and foliage of centipedegrass and bahiagrass. Symplasmic translocation of the herbicide was evident in both species. Translocation of foliar-applied sulfometuron increased from approximately 1 percent at 48 hours after application to 23 percent at 72 hours in bahiagrass. Metabolism of sulfometuron was greater in centipedegrass [69 percent of foliar-applied and 10 percent of root-applied] at 72 hours after application than in bahiagrass [30 percent of foliar-applied and 4 percent of root-applied]. Tolerance of centipedegrass to sulfometuron appeared to be related to a high degree of herbicide metabolism in the species.

PLANT COMPETITION

SOD PROXIMITY INFLUENCES THE GROWTH AND YIELD OF YOUNG PEACH TREES

W V Welker and D M Glenn
Journal American Society of Horticultural Science
Volume 114 Number 6
Pages 856-859
1989

Growth of young peach trees can be severely inhibited by competition from weeds or sod. Peach trees are known to be severely stunted when grown in association with common bermudagrass, and the addition of fertilizer and irrigation did not overcome this growth inhibition. Herbicides can effectively control vegetation in established peach plantings. Growth and leaf nitrogen levels of newly planted peach trees increased as the size of the vegetation-free area increased. This research conducted at the Appalachian Fruit Research Station in Kearneysville, West Virginia is a continuation of a study through three additional growing seasons.

Peach trees were grown for four growing seasons within a tall fescue sod in vegetation-free squares ranging in size from 0.36 to 13.0 meters square [1.2 to 43 feet square]. Tree growth, leaf nitrogen and fruit yield increased as the size of the vegetation-free area increased. A growth and field response plateau was reached at 9.0 meters square [29.7 feet square]. Tree growth was proportional to the size of the vegetation-free area throughout the length of the study. The magnitude of leaf nitrogen response declined with years. The fescue sod apparently restricted the effective root zone of the trees, thus controlling growth by limiting the volume of soil the tree could use.

Maximum vegetative growth of the young tree is necessary to fill its allotted space as rapidly as possible. However, tree growth must be contained later if high productivity is to be sustained in high-density plantings. At present, tree size is contained primarily with pruning. This work indicates that the placement and possible use of various types of grass as growth-modifying agents may be a useful and flexible management tool.

ANALYZING COMPETITION BETWEEN A LIVING MULCH AND A VEGETABLE CROP IN AN INTERPLANTING SYSTEM

L J Wiles, R D William and G D Crabtree
Journal American Society of Horticultural Science
Volume 114 Number 6
Pages 1029-1034
1989

Vegetable growers often plant a late-maturing cabbage crop for harvest during cool but inclement weather in the Pacific Northwest. Muddy field conditions prevail during crop growth or harvest, resulting in soil compaction that affects crop yields the following season. Living mulches planted between vegetable rows may decrease weed infestations, soil erosion, fertilizer and pesticide requirements, and soil compaction while enhancing organic matter, water infiltration, and moisture or nutrient retention. However, concern about interference between the vegetable and living mulch has impeded development of viable production systems.

This study conducted at Oregon State University employed an addition series and growth analysis combined with management strategies aimed at minimizing competition between the crop and the interplant. Pak choi was interplanted with strips of ryegrass that covered 67 percent of the soil.

Pak choi was a weak competitor compared to perennial ryegrass. Mulch suppression using a sublethal rate of fluazifop provided the most promising management strategy to reduce competition from the ryegrass interplant. Timing of suppression and reduction of mulch root growth were critical elements of successful management.

THREADING THE JOURNALS continued

GRASS LIVING MULCH FOR STRAWBERRIES

A C Newenhouse and M N Dana
Journal American Society of Horticultural Science
Volume 114 Number 6
Pages 859-862
1989

Traditional strawberry cultural practices include herbicide use and cultivation to maintain weed-free areas within and between matted rows. This soil management practice may present problems. Reliance on residual chemicals to kill weeds is not only expensive, but also creates ecological hazards. High soil temperatures, soil compaction, and subsequent poor soil aeration often slow root growth. Bare ground also is susceptible to water and wind erosion. Wind may damage leaves, flowers and fruit; may limit fruit size and yield; and, over long periods of time, may inhibit plant growth. Convection heat loss in winter may lower plant temperatures to lethal levels. Non-mulched plants also undergo greater temperature fluctuations.

A living mulch is "a crop production technique in which a food crop is planted directly into an established "cover crop". Under many conditions, living mulch may be a more effective technique than traditional methods to produce a quality crop and sustain high yields over many years. Little information is available on the use of a living mulch system to solve problems associated with clean cultivation of strawberry production.

This study conducted at the University of Wisconsin involved use of Sparkle and Honeoye strawberries planted into plots of newly seeded perennial ryegrass, Kentucky bluegrass, winter wheat or no grass. After a 1985 wind storm during the green fruit stage, yield was higher in living mulch plots than in control plots and fruit from control plots were small and dark relative to those from the ryegrass plots. In 1986, all plots had similar yields. All plants grew at similar rates during the establishment year. Later, strawberry plants in living mulch plots had smaller leaves than plants in control plots. Plants in all treatments contained above the critical concentrations of leaf nitrogen on most sampling dates. Soil under grass was less compacted and was cooler than cultivated soil. Living mulch prevented annual weed establishment after the first year and improved winter survival of flower buds. A tillering type of ryegrass was the best living mulch of the three species tested. It quickly covered the ground but did not spread into the crop rows, and grew tall enough to afford wind protection.

The Package of Seeds

I paid a dime for a package of seeds
And the clerk tossed them out with a flip.
"We've got 'em assorted for every man's needs,"
He said with a smile on his lip,
"Pansies and poppies and asters and peas!
Ten cents a package! And pick as you please!"
Now seeds are just dimes to the man in the store,
And the dimes are the things that he needs;
And I've been to buy them in seasons before,
But have thought of them merely as seeds;

But it flashed through my mind as I took them this time,
"You have purchased a miracle here for a dime!"
"You've a dime's worth of power which no man can create,
You've a dime's worth of life in your hand!
You've a dime's worth of mystery, destiny, fate,
Which the wisest cannot understand.

From: Edgar A. Guest, THE LIGHT OF FAITH
Chicago, Reilly & Lee, Co. 1926

In this bright little package, now isn't it odd?
You've a dime's worth of something known only to God!"
These are seeds, but the plants and the blossoms are here
With their petals of various hues;
In these little pellets, so dry and so queer,
There is power which no chemist can fuse.
Here is one of God's miracles soon to unfold,
Thus for ten cents an ounce is Divinity sold!

CAST Board Approves New Task Forces

The Board of Directors of the Council for Agricultural Science and Technology [CAST] met in Washington, DC on February 26-28,1990. The board approved seven new topics for reports. CAST, a nonprofit consortium of 29 professional scientific societies in food and agriculture, compiles and publishes reports on public issues related to food and agricultural science, and provides educational material for high school science teachers.

Two of the seven topics approved are:

"Public Perception of Agricultural Drugs and Chemicals." Regulatory actions pertaining to agricultural chemicals and drugs are affected by public perception and pressure applied to legislative bodies and regulatory agencies. The task force will study why the public perceives agricultural chemicals and drugs the way they do, and how realistic those perceptions are. Objectives for the task force are to determine the credibility of science with the public in the area of agricultural chemicals, to evaluate social reasons for public attitudes toward agricultural chemicals, and to compare the public perception and scientific fact.

"Risk/Benefit Assessment of Agricultural Chemicals." Regulatory decisions concerning the use of agricultural chemicals and drugs are based on the documented benefits associated with the historical use compared to documented and perceived risks associated with continued use. This report will explain this process and its effects on the pest-management and animal-health disciplines. Objectives are to assess the status of the risk/benefit method of determining usefulness and the methods used to measure risks and benefits, and to discuss particular areas in relation to worker safety, food safety, and the environment.

For more information on CAST, contact: Stanley P Wilson, Executive Vice President, Council for Agricultural Science and Technology, 137 Lynn Ave, Ames, Iowa 50010-7120 [515/292-2125].

To Market the New Generation of Buffalograss for Turf

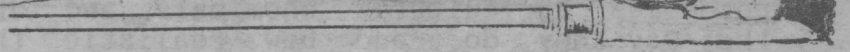
Sharp Brothers Seed Co is pleased to announce that an agreement has been reached between the University of Nebraska and Sharp Bros Seed Co on the worldwide production and marketing rights of the new generations of BUFFALOGRASS. After concluding long term evaluation and negotiations, an agreement has been reached to allow Sharp Bros Seed Co of Healy, Kansas to distribute "new generation cultivars" of the extremely drought tolerant Buffalograss into all areas, especially those concerned with the environment and water conservation. "We feel that this is an opportunity to provide the turfgrass industry with varieties of Buffalograss which require low amounts of water and maintenance and yet perform as a beautiful, durable turf", states Steve O'Neill, Turf Division Manager at Sharp Bros Seed Co.

"The first challenge," states Mr Gail Sharp, President of Sharp Bros Seed Co," is to utilize these varieties not only as vegetative, but as seeded varieties also. Evaluations will be instigated immediately within our production facilities. We hope to supply seed from these varieties within the next few years."

"The University of Nebraska is very pleased to be working with the Sharp Bros Seed Co on the development of a new seeded turf-type Buffalograss. The development of a new turfgrass cultivar requires a major commitment, and with Buffalograss, the research and time required may be even more significant.

"Buffalograss is a species which requires less water, fertilizer and mowing than other conventional turfgrasses. A turf-type Buffalograss will allow the consumer to continue to have a nice lawn, park or golf course, but with significant reductions in demands on the environment; i.e., less water use and less chemical use as pesticides or fertilizers," states Dr Terry Rierdon, breeder, University of Nebraska.

Sharp Bros Seed Co has been a leading producer and marketer of Buffalograss for over 30 years. Their commitment to Buffalograss is known throughout the entire seed industry. With the addition of this agreement, Sharp Bros Seed Co shows a continued dedication to provide leadership in the Buffalograss turf market, along with their many other turfgrass products.



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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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