January 1985

LAWN INSTITUTE

Harvests

Volume 31 Number 4

THE HARVEST MIX

The Harvest Mix for the January 1985 issue presents the following topics:

- The Lawn Institute reports on cultivars selected by it's Variety Review Board for special recognition during 1985.
- Words worth remembering from the 1984 American Seed Trade Convention in Denver are featured in Director's Dialogue.
- Statements concerning thirty-four published turfgrass research reports are included in Threshing The Journals.
- Plant Variety Protection as discussed in a new American Seed Trade Association bulletin is worthy of note in P O Box 108.
- Turfgrass conference topics on Sports Turf, Lawn Diseases, and New Turf Type Tall Fescues are reviewed.
- A fitting topic for LIP [Lawn Institute Pitch] is a "Tribute to Grass" by Dr James Boyce.

With the start of a new year, the Editors of Harvests wish you a happy and must successful 1985. We look forward to helping provide, through the release of our Press Kits, newsletters and other publications, the type of information that will be most useful and timely in the culture of lawns and sports turf.

Lawngrasses Recognized For

Forty two proprietary lawngrasses have been recognized for excellence this year by the Lawn Institute's Variety Review Board. According to Dr Leah Brilman of Jacklin Seed Company, Chairman of the Board, fourteen bluegrasses, five fine fescues, thirteen perennial ryegrasses, six turf type tall fescues, two bentgrasses and two specialty grasses were selected following extensive evaluation during 1984. Serving on the Board with Dr Brilman, have been Dr Jerry Pepin, Pickseed West; Dr Rich Hurley, Loft's Inc; Howard Kaewer, Northrup King; John Southerland, Stanford Seed Company; and Dr Bill Meyer, Turf-Seeds.

Over the years, from forty to fifty of the best lawngrasses available have been identified for special recognition each year. With increasing numbers of top performing cultivars available, the competition is keen. The 1985 list includes fewer bluegrasses and fine fescues and more turf type perennial ryegrasses and tall fescues. This reflects the increasing popularity and improved performance of these cultivars throughout the country.

THE LAWN INSTITUTE SEAL of APPROVAL
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Those turfgrasses selected for 1985 with their sponsoring firm are as follows:

BLUEGRASSES:

Adelphi -J & L Adikes Inc

America - Pickseed West Inc

Arboretum - Mangelsdorf Seed Company

Eclipse - Turf Cultivars Associates Growers

Fylking - Jacklin Seed Company

Glade - Jacklin Seed Company

Merit - Full Circle Inc

Monopoly - Pioneer Hibred; Turf Division

Nassau - Jacklin Seed Company

Nugget - Pickseed West Inc

Ram I - Loft's Inc

Rugby - Seed Production & Introduction Corporation

Sydsport - E F Burlingham & Sons

Touchdown - Pickseed West Inc

More Excellent Lawngrasses

Lawngrasses Recognized For Excellence Continued

FINE FESCUES:

Banner - Chewings - E F Burlingham & Sons

Ensylva - creeping - International Seeds Inc

Koket - Chewings - E F Burlingham & Sons

Reliant - hard - Lofts Inc

Waldorf - Chewings - Pioneer Hibred: Turf Division

TURF TYPE PERENNIAL RYEGRASSES:

All*Star - J & L Adikes Inc

Blazer - Pickseed West Inc

Citation - Turf-Seeds Inc

Delray - Northrup King & Company

Derby - International Seeds Inc

Elka - International Seeds Inc

Fiesta - Pickseed West Inc

Manhattan II - Stanford Seed Company

Omega - Turf-Seeds Inc

Pennant - E F Burlingham & Sons

Penntine - Seed Production & Introduction Corporation

Regal - International Seeds Inc

Repell - Lott's Inc

TURF TYPE TALL FESCUES:

Clemfine - Loft's Inc

Falcon - E F Burlingham & Sons

Galway - Northrup King & Company

Houndog - International Seeds Inc

Mustang - Pickseed West Inc

Rebel - Loft's Inc

BENTGRASSES:

Exeter - colonial - Pickseed West Inc

Prominent - creeping - Rothwell Seeds Ltd;
Seed Research of Oregon

SPECIALTY GRASSES:

Sabre - Poa trivialis - International Seeds Inc

Reubens - Canada bluegrass - Jacklin Seed Company

For more information on these lawngrasses, contact: The Lawn Institute, P O Box 108, Pleasant Hill Tennessee 38578 or the sponsoring firm.

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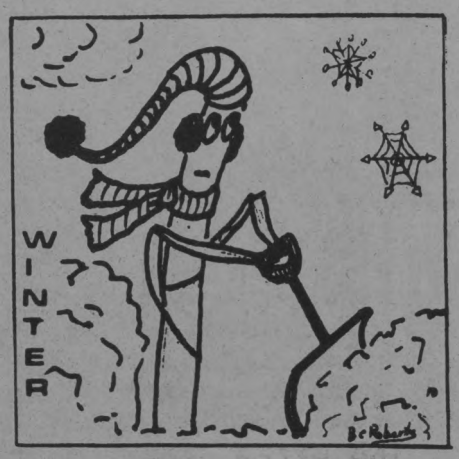


WORDS OF WISDOM
As ASTA Starts Second Century

by

Eliot C Roberts

The 101st Annual Convention of The American Seed Trade Association held in June 1984 was special in many ways. Topics discussed and issues presented are always noteworthy; however, this event staged in Denver featured two men from Colorado who shared ideas and experiences that were unique -- Dr Frank Court, Pastor, St James United Methodist Church, Central City, Denver, and Robert C Appleman, President of ASTA. Their words of wisdom are well worth remembering as ASTA moves into its second century of service and leadership in worldwide seed trade.

We are grateful to Dr Court for these thoughts:

- Seed growers are co-partners with God. The world was created but not finished to a state of perfection. As Adam left the garden, he must have said, "I'll build a greater garden". Thus, seed planting became the second oldest profession. The oldest profession is apple picking, not what you may have heard. Now, we all realize the joy of cooperating with people in the best possible way to improve the world - growing plants.

- It is said that there are one hundred million miracles each day. Seedsmen are part of the miracle of growth. Seeds produce so that a harvest may be gathered.

- It takes strength for seed to grow. All worlds lie folded in the life of the seed. This represents the joy of all living. Seeds set an example for humankind. They do everything that life demands and then do something more. The extra they give makes life glorious.

- The growth of seed illustrates nine conditions required for our success: health, wealth, grace, strength, patience, charity, love, faith, hope. Success with seed always yields and gives back more than is planted. All people can love the soil and leave it better than they found it.

Bob Appleman presented these thoughts as a sound basis for the future of agriculture:

- ASTA places emphasis on "First the Seed". Without seed, there is no harvest, no fish, no man, no industry and no world.

- The geographic frontier is gone; the scientific age has just begun and there is no limit to this frontier. Mind and imagination open all doors for the future. From the sacred seed, we move on to a new future for agriculture through genetic engineering.

- We are living in a complex world. Tough times never last but tough people do. Great people are ordinary people with a great amount of determination. Freedom has a price; that price is responsibility. Mature men and women must be responsible in practicing the freedoms earned for us. Lincoln was a great man, not because he came from a log cabin, but because he got out of it.

- Every generation has faced the challenge of preserving the land and freedom. We must read the signs wisely and carefully. We must not barter away our national birthright.

- To be born a free man is an <u>accident</u>; to live a free man is a <u>responsibility</u>; to die a free man is an <u>obligation</u>.

THRESHING THE JOURNALS

(Published research results)

HEAT STRESS EFFECTS ON PROTEIN SYNTHESIS AND EXOSMOSIS OF CELL SOLUTES IN THREE TURFGRASS SPECIES

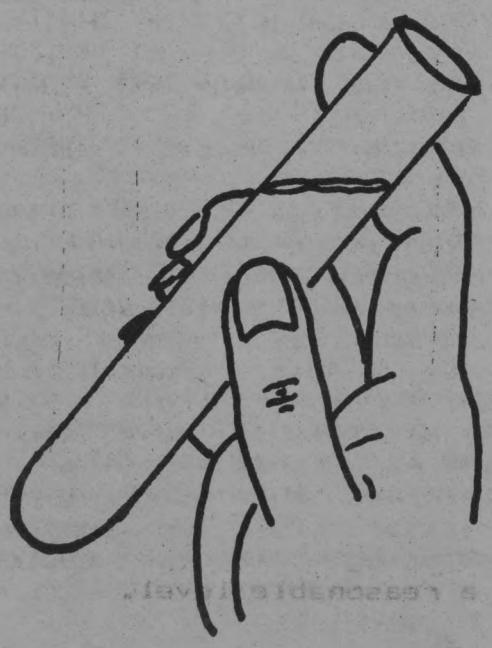
D J Wehner and T L Watschke

Agronomy Journal Vol 76 Number 1 16-19

Turfgrass species and cultivars within species differ in their ability to tolerate exposure to short periods of high temperature (direct heat stress). The status of plants following a recovery period depends on the amount of injury which occurred and the repair or tolerance of that injury.

Kentucky bluegrass, annual bluegrass and perennial ryegrass differ in their heat tolerance. An evaluation of species differences in the degree of initial injury from heat stress was made using radio-labeled leucine as an indicator of the net rate of protein synthesis. Also the efflux of cell solutes from plant tissue sections into distilled water was evaluated immediately after turfgrass shoots or tissue sections were exposed to high temperatures.

Net protein synthesis was very heat labile. Leucine declined an average of sixty nine percent in plants previously heated at 43 degrees C(109 degrees F) compared to plants held at 27 degrees C(81 degrees F). Efflux of cell solutes did not increase in plants that had been heated to 43 to 49 degrees C(109 to 120 degrees F) compared to plants held at 25 degrees C(77 degrees F). No differences were noted between grasses. Either disruption of some other physiological process or differential repair or tolerance of heat stress injury accounts for current heat tolerance rankings of test species. Also, indirect rather than direct heat injury is responsible for the behavior of the grasses stressed at the temperatures and exposure periods used in this study.



THATCH ACCUMULATION IN BERMUDAGRASS AS INFLUENCED BY CULTURAL PRACTICES

R H White and R Dickens

Agronomy Journal Vol 76 Number 1 19-22

Turfgrass sods often develop distinct profiles with horizons of pseudothatch, thatch and mat. Excessive thatch accumulation is a serious problem in golf course putting greens and other intensively managed turfgrass areas. Tifdwarf, Tifgreen and Dothan bermudagrasses were evaluated for thatch accumulation as influenced by nitrogen source, core aerification, vertical mowing and sand topdressing.

Tifdwarf produced more thatch than Dothan and Tifgreen; Dothan more than Tifgreen. Cultural practice effects were essentially the same on all three cultivars. Topdressing was the most effective cultural practice for controlling thatch. If vertical mowing or core aerification are to be effective, they must be programmed more intensively than considered practical in this study. Effects of topdressing rates, intervals and sources with respect to nitrogen fertility regimes need further study.

PLANT-PARASITIC NEMATODE POPULATIONS IN BERMUDAGRASSES AS INFLUENCED BY CULTURAL PRACTICES

R H White and R Dickens

Agronomy Journal Vol 76 Number 1 41-43

Plant-parasitic nematodes are associated with turfgrass decline. Nematodes can be a serious problem in bermudagrass putting greens, especially those on sandy soil in the southern United States. Nitrogen source, core aerification, vertical mowing and topdressing practices were evaluated on Dothan, Tifdwarf and Tifgreen bermudagrass.

Activated sewage sludge enhances biological nematode control. Favorable factors for soil nematode buildup seem to be decreased by use of activated sewage sludge. Thus, a rapid buildup of nematodes in the soil is prevented. These include stubby, ring, stunt and spiral nematodes. Topdressing, vertical mowing and core aerification treatments had no consistent effects.

Dothan supported higher populations of stunt and stubby nematodes. Tifgreen and Tifdwarf cultivars supported more spiral nematodes. Tifdwarf supported the greatest overall plant parasitic nematode population.

THRESHING THE JOURNALS CONTINUED

TURF QUALITY OF KENTUCKY BLUEGRASS CULTIVARS AND ENERGY RELATIONS

B J Mehall, R J Hull and C R Skogley

Agronomy Journal Vol 76 Number 1 47-50

Properties of turfgrass, such as color, density, leaf blade angle and width, susceptibility to disease, preference by herbivorous insects and ability to recover from mechanical injury, are all recognized as influencing turf quality. Morphological features of turfgrasses are better recognized than physiological properties which enable a grass to tolerate stress conditions. Because turfgrass quality is not related directly to dry matter production, it seems reasonable that the energy status, those physiological processes involved in energy capture and transport within the plant, be considered.

Carbon dioxide exchange rate, clipping growth rate and nutrient factors have been correlated with turf quality in these studies. Fifteen cultivars of Kentucky bluegrass, including Adelphi, Fylking, Glade, Nugget, Rugby, Sydsport and Touchdown were evaluated. Carbon dioxide exchange rate differed between cultivars. Trends toward correlation with turf quality were noted. The percentage of current photosynthate translocated to roots was positively correlated with the size of the root system and negatively correlated with production of clippings. Cultivars which partition more energy to roots appear more likely to produce quality turf.

While turf quality is a highly integrated phenomenon and should not be expected to exhibit a high correlation with any single physiological parameter, measures of plant energy status can be significantly related to quality.

TURFGRASS EVAPOTRANSPIRATION. II RESPONSES TO DEFICIT IRRIGATION

C M Feldhake, R E Danielson and J D Butler

Agronomy Journal Vol 76 Number 1 85-89

In the arid west, deficit irrigation has contributed significantly to efficient utilization of water resources. In turfgrass managment, yield must be defined in terms of gain from water expended. In Colorado, the effect of deficit irrigation on turfgrass quality has been studied.

Kentucky bluegrass decreased about ten percent in quality with an irrigation schedule providing up to a twenty seven percent evapotranspiration deficit. When evapotranspiration was maintained at greater than thirty percent deficits, the quality rating was lower if the turf was mowed at one inch than at two inches. When nitrogen fertility was low, maximum evapotranspiration and maximum quality attained were decreased. The response of tall fescue to deficit irrigation was similar to Kentucky bluegrass. Buffalograss responded differently.

Decreasing evapotranspiration increased turfgrass canopy temperature 1.7 degrees C (3.6 degrees F) for each ten percent decrease in irrigation up to seventy percent. Thus, temperature is a significant factor to consider when planning how to best manage municipal water resources. Buildings, trees and privacy fences restrict air movement and slow convective mixing with higher air currents creating a boundary layer. Significantly higher air temperature can be expected in this region when irrigation is decreased below requirements for maximum evapotranspiration. These higher temperatures may inhibit enjoyment of outdoor activities and increase home air conditioning requirements.

EFFECT OF SAMPLE PREPARATION AND pH ON THE CATION EXCHANGE CAPACITY OF THATCH

T K Danneberger, A J Turgeon and T R Peck

Agronomy Journal Vol 76 Number 1 155-156

Where a substantial thatch layer has developed, it can serve as the primary medium supporting turfgrass growth. Chemical and physical properties of thatch are important in interpreting soil test results and plant growth response. Most research has been concerned with thatch control. Studies at the University of Illinois have focused on edaphic properties of thatch. Data from this study indicates that the nutrient-retention of a thatch layer could be substantially improved by ensuring that the thatch pH is sustained at a reasonable level.

THRESHING THE JOURNALS CONTINUED

PHYSIOLOGICAL RESPONSE OF ST AUGUSTINEGRASS TO IRRIGATION SCHEDULING

C H Peacock and A E Dudeck

Agronomy Journal Vol 76 Number 2 275-279

A large part of the energy input for turfgrass management is related to irrigation. Limited water use imposes stress on turfgrass which results in reduced quality. In order to help minimize the effects of water stress resulting from reduced irrigation frequency, research on irrigation practices is required. The general response of St Augustinegrass during this study was associated with stress induced by irrigation scheduling and the ability of the turf to recover upon rewatering. Irrigation rates equivalent to potential evapotranspiration based on climatological data were evaluated. Carbon balance changed from day to day under the most frequent irrigation regime.

INFLUENCE OF SELECTED WHITE-ROT FUNGI AND TOPDRESSINGS ON THE COMPOSITION OF THATCH COMPONENTS OF FOUR TURFGRASSES

J B Sartain and B G Volk

Agronomy Journal Vol 76 Number 3 359-362

Thatch accumulation results from an imbalance between the production of vegetative material and decomposition processes at the soil surface. A number of factors are believed to influence these processes - essentially microbiological in nature. Since effective biological controls for thatch have not been developed and since white-rot fungi degrade lignin, and since topdressing has been one of the most effective cultural practices used in thatch control, fungus-topdressing influences on thatch were investigated at the University of Florida.

Under treatments imposed, the cellulose content of bermudagrass and centipedegrass thatch was reduced by Phebia gigantea. St Augustinegrass and Kentucky bluegrass thatch were not affected by any of the four fungi studied. All four turfgrass species contained less thatch lignin in the presence of Coriolus versicolor. This fungus also reduced the total oxidizable organic matter of bermudagrass and centipedegrass.

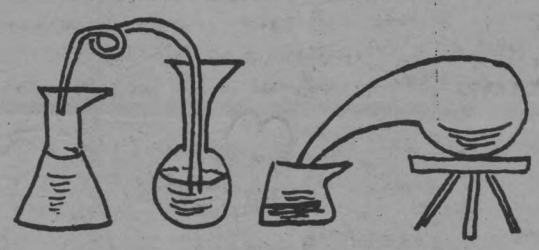
Topdressing with sand and colloidal phosphate reduced cellulose and lignin contents of turfgrass thatch. Kentucky bluegrass thatch contained the lowest quantity of lignin and St Augustinegrass thatch the least cellulose.

PREDICTING COLD TOLERANCE IN PERENNIAL RYEGRASS FROM SUBCROWN INTERNODE LENGTH

G M Wood and R P Cohen

Agronomy Journal Vol 76 Number 4 516-517

As a species, perennial ryegrass is considered to have poor lawn temperature tolerance. Increasing evidence of cold tolerant types is now available. Of the many new improved cultivars, several are known to have improved winter hardiness. Thirty five perennial ryegrass cultivars, including Blazer, Citation, Derby, Fiesta, Manhattan, Omega and Regal were compared with Kenblue Kentucky bluegrass for hardiness. Manhattan, Omega, Citation and Derby rated close to the bluegrass in hardiness ranking. Cultivars with a relatively short subcrown internode length generally had less winter injury than did those with a longer subcrown internode length.



PREDICTING SAND CONTENT OF MODIFIED SOIL MIXTURES FROM SAND, SOIL AND PEAT PROPERTIES

D H Taylor and G R Blake

Agronomy Journal Vol 76 Number 4 583-587

In order for turf to withstand detrimental effects of soil compaction, various methods are used in soil modification. In most instances, sand is mixed with soil and some source of organic matter. When modified properly, the mixture is able to maintain a sufficiently high infiltration rate, air filled porosity and oxygen diffusion rate for production of healthy turf even under heavy sports use. Physical soil properties, including saturated hydraulic conductivity, water release characteristics, bulk density and porosity are evaluated prior to writing specifications for soil modification using predetermined materials. The volume ratio needed to obtain a specified sand content varies considerably depending on the texture of the soil used in the mixture.

In order to achieve ninety percent sand in a mixture using a typical silt loam, requires a volume ratio of 7-1-1(sand-soil-peat). A mixture using a sandy loam soil may require only a volume ratio of 3-1-1. Relative to mixing volumes and soil texture, other variables had minor effects on the sand content of the final mix.

THRESHING THE JOURNALS CONTINUED

EFFECTS OF NITROGEN, TEMPERATURE AND MOISTURE STRESS ON THE GROWTH AND PHYSIOLOGY OF CREEPING BENTGRASS AND RESPONSE TO CHELATED IRON

R E Schmidt and V Snyder

Agronomy Journal Vol 76 Number 4 590-594

Applications of iron often improve creeping bentgrass quality in the transition zone even though soils contain sufficient quantities of this trace element. Studies with Penncross creeping bentgrass have shown that foliar applications of FeDTPA increased top growth during cool temperatures. As temperature increased, FeDTPA applications depressed top growth. Net photosynthesis was reduced but dark respiration remained unchanged. Foliar carbohydrates were increased and appeared directly related to corresponding top growth reductions. A more decumbent growth habit of the bentgrass was associated with repeated moisture stress. Net photosynthesis decreased as soil moisture levels declined. Dark respiration was lower for plants grown at the lowest irrigation regime. This reduction in dark respiration may help to account for the increased foliar carbohydrates associated with infrequent irrigation.

ASSESSMENT OF VISUAL EVALUATION TECHNIQUES

G L Horst, M C Engelke and W Meyers

Agronomy Journal Vol 76 Number 4 619-622

National and regional evaluation trials are extensively used for determining the environmental and regional adaptation of newly developed turfgrass cultivars. Presently accepted evaluation techniques for assessing turfgrass quality and density are considered inadequate. Highly individualized reference planes cause information collected to be subjective. Perceived agronomic variables are too loosely defined. Techniques or schemes must be well defined, properly documented and highly consistent among evaluators. Variables must be described biologically using dimensions which are definable by graphic or other reference points. Without this type of substantiation, data assembled through the conventional assessment schemes must be interpreted with caution.

INITIAL MOWING OF KENTUCKY BLUEGRASS-PERENNIAL RYEGRASS SEEDLING TURF MIXTURES

A D Brede and J M Duich

Agronomy Journal Vol 76 Number 5 711-714

Kentucky bluegrass and turf type perennial ryegrasses combine well in the lawn to form uniform appearing turf with favorable genetic diversity. Balanced mixtures of these are difficult to obtain because of the more vigorous seedling growth of ryegrass relative to bluegrass. Clipping practices and composition of the seed mixtures have been studied at Pennsylvania State University.

Kentucky bluegrass was generally more prevalent where close mowing treatments were used shortly after emergence. Commencement of mowing two weeks after planting (nine days after emergence of the ryegrass) was favorable to the bluegrass. At this time there was a fifty percent foliar ground cover. Mowing at 3.8 cm(1.5 inches) required at least ninety five percent bluegrass in the mix to produce a fifty-fifty mixture of the two species at two months. Mowing at 1.3 cm (0.5 inch) two weeks after planting needed only fifty to seventy five percent bluegrass seed to achieve the same result. Shoot density, shoot size and leaf area index of Kentucky bluegrass in mixed stands tends to decrease with an increase in the initial height of cut and/or with weeks after the first mowing. Density and size of perennial ryegrass shoots tended to increase under these conditions.

TALL FESCUE RESPONSE AND SOIL PROPERTIES FOLLOWING SOIL AMENDMENT WITH TANNERY WASTES

A L Stomberg, D D Hemphill Jr, V V Volk and C Wickliff

Agronomy Journal Vol 76 Number 5 719-723

Chrome leather tanning processes are used extensively in the United States. Industry waste contains lime, hair, salts and metals, such as chromium, copper, manganese, zinc and lead, as well as fats, oils and dye residues. A study at Oregon State University has considered use of tannery wastes on tall fescue. Soil and fescue copper, zinc and magnesium concentrations varied only slightly with waste application. Soil total chromium levels increased as much as sevenfold. Fescue chromium concentrations increased only slightly or not at all. Fescue manganese decreased. Both soil and fescue calcium and nitrogen increased. Soil electroconductivity increased. Fescue yields were increased with the use of tannery waste.

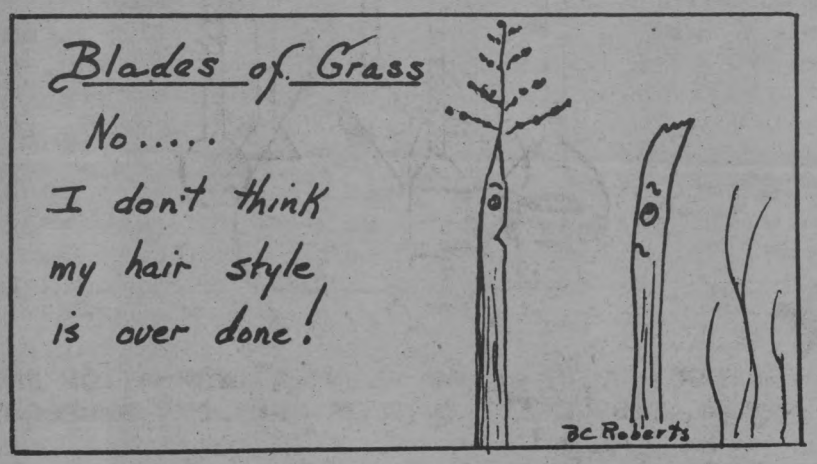
THRESHING THE JOURNALS CONTINUED

ANNUAL BLUEGRASS SEEDHEAD EMERGENCE AS PREDICTED BY DEGREE-DAY ACCUMULATION

T K Danneberger and J M Vargas Jr

Agronomy Journal Vol 76 Number 5 756-758

Golf course fairways and greens are often contaminated with annual bluegrass. Seedhead production reduces aesthetic quality and disrupts the uniformity of the playing surface. Maximum flowering is induced by short days, but flowering occurs over a wide range of photoperiods. An accurate prediction of the initiation of seedheads would permit the adjustment of cultural practices (irrigation, vertical mowing, core cultivation and use of seedhead suppressive compounds) for greatest efficacy. A model to predict the number of seedheads from visual emergence through maximum production has been developed. This is based on degree day accumulation.



FOUR-YEAR RESPONSE OF A KENTUCKY BLUEGRASS-RED FESCUE TURF TO PLANT GROWTH RETARDANTS

P H Dernoeden

Agronomy Journal Vol 76 Number 5 807-813

Plant growth retardants suppress vertical shoot growth of turfgrasses and therefore have the potential to reduce expenditures allocated to fuel and labor for mowing. Other benefits of plant growth regulators include: growth control during rainy periods; reduced mowing frequency; growth control in areas difficult or dangerous to mow; conservation of soil moisture.

Two annual applications of the following growth regulators - Flurprimidol, Mefluidide, and Ethephon - caused adverse effects which would limit their use on intensively managed turf. One of the Flurprimidol formulations provided excellent and uniform growth suppression and discolored turf less than other formulations. Mefluidide provided excellent seed head suppression but reduced density of stand. Ethephon treated turf possessed best overall summer quality but detrimental fall and spring color and crown elevation were objectionable. No detrimental effects on roots were observed.

MOISTURE SENSOR-CONTROLLED IRRIGATION FOR MAINTAINING BERMUDAGRASS TURF

B J Augustin and G H Snyder

Agronomy Journal Vol 76 Number 5 848-850

Turf irrigation studies traditionally have been conducted in arid regions. Erratic rainfall frequency and distribution makes irrigation necessary in non arid locations. Soil moisture tension measurements are helpful in determining timing and duration of irrigation. Use of tensiometer soil moisture sensing devices to schedule irrigation of bermudagrass and their impact on nitrogen fertilization practices under sub-tropical conditions have been studied.

Irrigation water savings of forty-two to ninety-five percent were obtained where sensor scheduling was practiced. Greatest value was realized during periods of frequent but unpredictable rainfall. Application of a wetting agent was necessary during extended dry periods to prevent the formation of localized dry spots. Reduced irrigation resulted in better turf appearance and equal effectiveness of water soluble and slow-release nitrogen fertilizers.

INDICATIONS OF YEARLY VARIATION OF ACREMONIUM COENOPHIALUM IN SEED FROM A PERMANENT TALL FESCUE SWARD

J F Pedersen, M J Williams, E M Clark, and P A Backman

Crop Science Vol 24 Number 2 367-368

The fungal endophyte, Acremonium coenophialum - also called Epichloe typhina - is associated with tall fescue and the cattle disease, fescue toxicosis. Establishing endophyte-free tall fescue pastures or eradicating the endophyte in presently infected pastures offers excellent potential for improving animal performance. The presence of endophyte in turfgrasses has been directly related to decreased proneness to injury by some insect pests. Since endophyte spread is through infected seed, seed characteristics related to this process are increasingly important.

A tall fescue breeder seed nursery in Tallassee, Alabama, originally thought to be endophyte free produced essentially clean seed for four years. However, breeder seed was thirty one percent infected in 1982. The breeder seed field was found to have been established from seed that was fifty nine percent infected, producing plants that were fifty seven percent infected in 1982.

Endophyte levels may have increased by some means of inoculum spread or yearly environmental differences may have influenced the level of infected seed produced. Either of these explanations would have considerable impact on the method and/or value of certifying tall fescue seed as endophyte-free. Seed assays may not reflect the level of endophyte infection of plants in a stand.

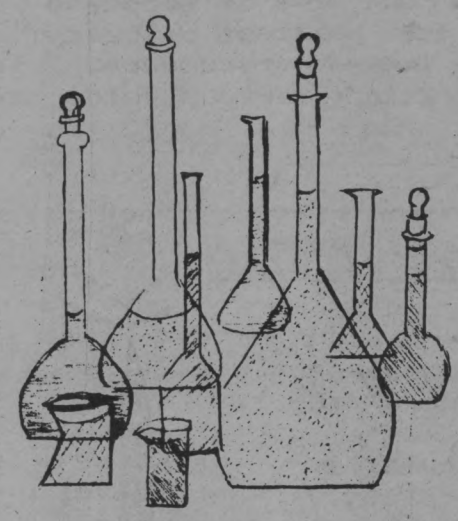
INTERRELATIONSHIPS BETWEEN RATES OF LEAF APPEARANCE AND TILLERING IN SELECTED TALL FESCUE POPULATIONS

K M Zarrough, C J Nelson and D A Sleper

Crop Science Vol 24 Number 3 565-569

Herbage production by grass swards is associated with tiller density and yield per tiller in the sward. Leaf elongation rate is directly related to herbage yield of tall fescues. An inverse relationship exists between rate of leaf elongation and tillering. Tiller density has little effect on herbage yield after an equilibrium density is reached where rate of tiller production is balanced by rate of tiller death. Before equilibrium tiller density is attained, the number of tillers per plant have a direct effect on dry matter production and leaf area index.

An investigation of the relationship between rates of leaf and tiller appearance in populations of tall fescue selected for high or low leaf area expansion rate resulted in strong negative associations between leaf elongation rate, site usage and leaf appearance rate per tiller. Simultaneous selection for both greater number of tillers and rapid leaf elongation rate would be difficult on the basis of these studies. Further tillering is influenced about three times more by leaf appearance than by site usage.



CALLUS INDUCTION AND PLANTLET FORMATION FROM MATURE EMBRYO EXPLANTS OF KENTUCKY BLUEGRASS

R E McDonnell and B V Conger

Crop Science Vol 24 Number 3 573-578

Kentucky bluegrass is an aposporous, psuedogamous, facultative apomict which produces nonzygotic embryos. Can callus cultures form somatic embryos in vitro ? Research was conducted to demonstrate callus induction and plantlet regeneration from mature embryo explants and to determine if the mode of plantlet regeneration was by organogenesis or embryogenesis.

The synthetic auxins, dicamba and picloram produced the best callus growth and the most germination suppression. Variation in callusing and plant regeneration was noted for cultivars varying in their percent of apomictic reproduction. Low frequencies of plantlet formation and no relationship between apomixis and plant regeneration were noted. Chromosome counts were not different between cultivar reference and regenerated plants. A 15 degree C (59 degree F) temperature with a cold treatment of 4 degrees C (39 degrees F) for seven days increased plant regeneration in Ram I Kentucky bluegrass. An histological examination of calli demonstrated the mode of plant regeneration to be organogenesis.

IDENTIFICATION OF KENTUCKY BLUEGRASS CULTIVARS WITH ESTERASE AND PHOSPHOGLUCOMUTASE ISOENZYME MARKERS

L Wu, A H Harivandi, J A Harding, and W B Davis

Crop Science Vol 24 Number 4 763-768

Electrophoresis and isoenzyme techniques have been used effectively for cultivar identification in crop plants. Kentucky bluegrass cultivars are apomictic and produce seeds by asexual means. Somatic cells or unreduced gamates produce progeny identical with the parent. A balance between sexual and apomictic reproduction in Kentucky bluegrass is altered by environmental conditions.

Starch gel electrophoresis was used to identify twenty four Kentucky bluegrass cultivars, including Adelphi, America, Fylking, Glade, Nugget and Ram I. Isoenzyme variation in esterase, phosphoglucomutase, phosphoglucoisomerase and glutamate-oxaloacetate transaminase was examined. Esterase and phosphoglucomutase patterns were variable among the twenty four cultivars. Differences were noted between seed and seedling samples. Variation was found between seed lots. When seedlings from a seed lot are mixed, a constant pattern is obtained for different seed lots of the same cultivar. This should permit the "finger printing" characterization of Kentucky bluegrass cultivars even when there is some segregation from sexual reproduction.

INFLUENCE OF TEMPERATURE ON LEAF DARK RESPIRATION OF DIVERSE TALL FESCUE GENOTYPES

J J Volenec, C J Nelson and D A Sleper

Crop Science Vol 24 Number 5 907-912

Reduction of dark respiration of mature tissues could improve herbage yield of tall fescues, especially during summer. Seven tall fescue genotypes were examined in terms of dark respiration as influenced by temperature, concentrations of water soluble carbohydrates, and nitrogen content of leaf blades.

Dark respiration at 27 degrees C (81 degrees F) or less was similar for different genotypes. At 30 degrees C (86 degrees F) dark respiration rates averaged forty percent higher than those at 27 degrees C or less. No plants survived at 34 degrees C (93 degrees F). The carbon dioxide exchange rate decreased as temperatures increased. This was not related to dark respiration. At 27 degrees C or less, water soluble carbohydrates were lowest, while concentrations of nitrogen were highest in leaf blades of genotypes with high dark respiration. As temperature increased, water soluble carbohydrates decreased while nitrogen increased. Genotypes with high dark respiration yielded less per tiller and mass of water soluble carbohydrates per stem base when compared with low dark respiration plants.

'A wet January A wet Spring'

HYDROPONIC CULTURE OF GRASS PLANTS FOR PHYSIOLOGICAL EXPERIMENTS

H F Howard and T L Watschke

Crop Science Vol 24 Number 5 991-992

A large number of grass plants are often cultured for use in physiological experiments. Hydroponic systems that are inexpensive to construct, require minimal maintenance and can be left unattended for several days have been useful as a research tool. Plants produced must be uniform in size and easily harvested and cleaned. A new system is in use at Pennsylvania State University.

THRESHING THE JOURNALS CONTINUED

POTENTIAL FOR GENETICALLY MODIFYING DARK RESPIRATION OF TALL FESCUE LEAVES

J J Volenec, H T Nguyen, C J Nelson and D A Sleper

Crop Science Vol 24 Number 5 938-943

High dark respiration rate may be a physiological process associated with low herbage yield of tall fescues during summer. Significant genetic variation for dark respiration of leaf blades has been found. Narrow-sense heritabilities of 0.60 to 0.70 indicate that additive gene action for dark respiration exists.

Family selection should be considered for population improvement because of the influence of environment on dark respiration. Selection for dark respiration is expected to occur independently from other characteristics measured.

KENTUCKY BLUEGRASS CULTIVAR AND BLEND RESPONSE TO BLUEGRASS BILLBUG

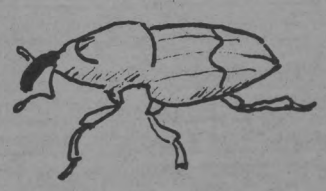
R C Shearman, D M Bishop, D H Steinegger and A H Bruneau

HortScience Vol 18 Number 4 441-442

Throughout the Great Plains, billbug larvae are damaging in Kentucky bluegrass lawns. This occurs from June to August when heat and drought stress are most severe. Injury is usually noted in direct relation to the number of larvae present. In general, few larvae and only limited injury is associated with natural or common type Kentucky bluegrasses.

A natural billbug infestation in bluegrass trials in Nebraska resulted in greater larval density and turfgrass injury for Nugget, Sydsport and Fylking Kentucky bluegrasses than for Newport, Park and South Dakota Kentucky bluegrassses.

Turf established from blends of Fylking, Nugget and Sydsport attracted more larvae and was injured more than turf consisting of Fylking, Park and South Dakota Kentucky bluegrasses.



billbug

CHARACTERISTICS OF CREEPING BENTGRASS CLONES FROM A SALINITY-TOLERANT POPULATION AFTER SURVIVING DROUGHT STRESS

L Wu and D R Huff

HortScience Vol 18 Number 6 883-885

Creeping bentgrasses have natural tolerance of salinity. Many tolerant ecotypes have been found in salt marshes and along the seashore. Cultivar differences have been noted.

A severe drought stress was imposed on a salinity-tolerant creeping bentgrass population maintained as turf. Seaside was used as the test bentgrass. Two groups of plants were identified that represented differences in morphology and physiology. No relationship between osmotic stress resistnace and drought stress survival in this population was noted. Drought tolerant plants were usually heat tolerant and had larger root/shoot ratios.

REGENERATION FROM PERENNIAL RYEGRASS CALLUS TISSUE

W A Torello and A G Symington

HortScience Vol 19 Number 1 56-57

Mature caryopses of Yorktown II perennial ryegrass were used in callus initiation. Callus maintenance techniques were evaluated and experiments conducted on plant regeneration. Root and shoots were developed successfully. Phenotypic variation in regenerated plants was noted. Ten percent of all successful regeneration treatments produced the lethal albino character. All green regenerants were successfully transplanted to soil for greenhouse evaluation. These plants varied in leaf texture and relative growth rate.

THRESHING THE JOURNALS CONTINUED

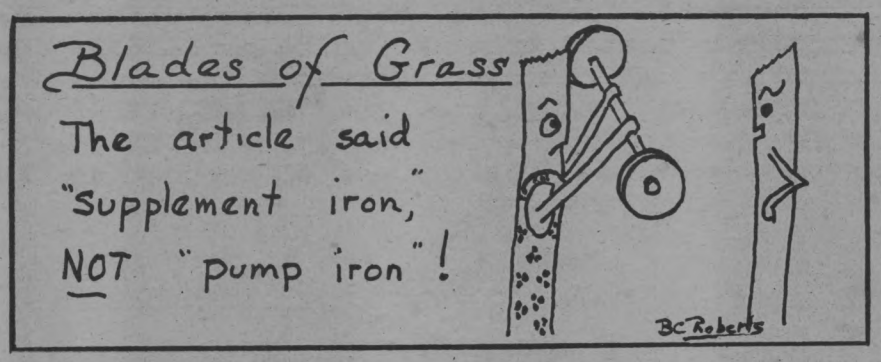
CORRECTING IRON DEFICIENCY OF KENTUCKY BLUEGRASS

D D Minner and J D Butler

HortScience Vol 19 Number 1 109-110

Turfgrasses grown on alkaline soils are subject to iron deficiencies. Cultivar differences have been observed. These are important because chlorophyll content of tissue is directly related to turfgrass color and total plant iron.

Iron chelates, iron salts and acid-treated mine tailings increase greening of Kentucky bluegrasses. Acid mine tailings and iron salts produced a longer lasting effect on color than iron chelates. In this Colorado study, four chelates were included (Ferriplex 138, Payplex, Sequesterene 138 and Sequestrene 330). Two iron salts (ferrous sulfate and ferrous ammonium sulfate) were compared. And one acid iron compound (mine tailing) was tested.



GERMINATION OF TALL FESCUE AND KENTUCKY BLUEGRASS AS AFFECTED BY ADHESIVES

A L Hathcock, P H Dernoeden, J J Murray and D J Wehner

HortScience Vol 19 Number 3 442-443

Seed coatings have been used effectively on vegetables and legumes to improve stand establishment. Survival of rhizobia on legume seed has been influenced by coatings of this type. Kentucky 31 tall fescue and Adelphi Kentucky bluegrass were studied to determine the effect of seed coatings of limestone and several adhesives on germination and early seedling growth.

The adhesives (gum arabic, Methocel A-15, Pelgel, Solka Floc) did not adversely affect seed germination, turf quality and early growth of seedlings of either species. Adhesive effectiveness for the retention of a limestone seed coating was in the decreasing order: Methocel A -15, Pelgel, Solka Floc. These may be useful substitutes for gum arabic.

MANAGEMENT OF PREEMERGENCE HERBICIDES FOR CRABGRASS CONTROL IN TRANSITION-ZONE TURF

P H Dernoeden

HortScience Vol 19 Number 3 443-445

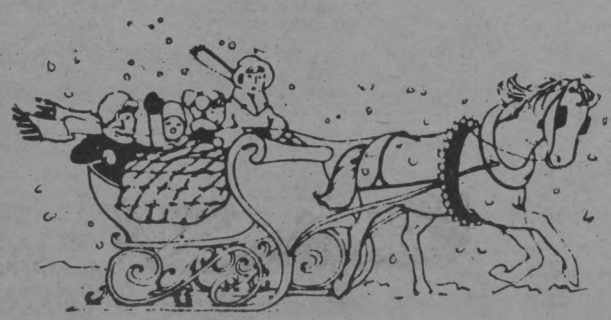
Preemergence herbicides effectively control crabgrass. However, the effectiveness varies from year to year and is different depending on region of the country. Season-long crabgrass control in the transition zone is dependent on herbicide, rate of application and use of reduced rates in subsequent years to maintain control. Bensulide, Benefin, DCPA, Oxadiazon and Siduron were compared in 1980,1981, and 1982. Oxadiazon provided greatest control (94 to 100 % range). Bensulide varied in control from 56 to 99 %. Benefin control was as low as 34 % and as high as 100 %. DCPA had a high level of 95 % and a low of 26 %. Siduron control varied from 5 to 67 %.

OBSERVATIONS ON BUFFALOGRASS SEXUAL CHARACTERISTICS AND POTENTIAL FOR SEED PRODUCTION IMPROVEMENT

L Wu, A H Harvindi and V A Gibeault

HortScience Vol 19 Number 4 505-506

Buffalograss is a native warm-season turfgrass species of the American great plains. The species is dioecious. Seed harvest is difficult because seed heads are born near the ground by the pistillate plant. Actually three sex forms (dioecious, monoecious and hermaphrodite) have been found in a buffalograss population. A 1:1:1 ratio of female: male: monoecious is common. Monoecious plants and hermaphrodite flowers are self-incompatible. Cross-pollinated hermaphrodite flowers yield about fifty percent seed set. A large variation in inflorescence height suggests that there is a potential for selection to make seed harvest more favorable. Selections might also be made for the hermaphrodite character so as to establish hermaphrodite cultivars.



THRESHING THE JOURNALS CONTINUED

SOIL TEST CALIBRATION FOR ESTABLISHMENT OF TURFGRASS MONOSTANDS

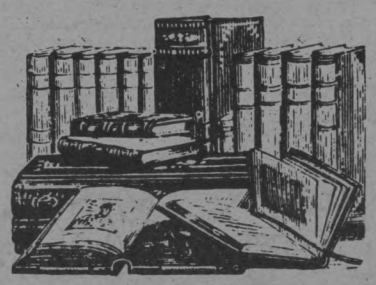
T R Turner and D V Waddington

Soil Science Journal Vol 47 Number 6 1161-1166

A wide disparity exists among soil testing laboratory recommendations for turfgrass establishment. Thus, if meaningful interpretations of soil tests are to be made, field studies must determine interrelationships among soil nutrient levels, applied fertilizer and turfgrass establishment response on different soils, under various uses and with different species and varieties. Research in Pennsylvania has been conducted to relate phosphorus, potassium and limestone seedbed applications to establishment response of monostands of Baron Kentucky bluegrass, Atlanta Chewings fescue and Pennfine perennial ryegrass. A soil test was used to establish base levels of acidity and nutrients.

Phosporus applications to this soil had the most important effect on turfgrass establishment. The initial soil level was not adequate to stimulate rapid seedling growth. Availability of additional phosphorus promoted rapid establishment as determined by chemical composition of tissue, ground cover, clipping yield and quality. Phosphorus induced differences tended to diminish with time, indicating that where rapid establishment is not important, this soil had sufficent phosphorus to obtain satisfactory stands of the species tested.

The initial pH (5.7), potassium and calcium levels were sufficient for satisfactory turfgrass establishment on this soil. Applications of limestone did not affect ground cover, tended to reduce initial clipping yields, had no influence on turfgrass quality, slightly reduced sod strength and generally did not greatly effect tissue calcium levels. Potassium applications either reduced or had no effect on initial ground cover and had little effect on turfgrass quality. Tissue potassium was substantially increased by potassium applications. However, the potassium levels of all three species grown in soil not fertilized with potassium were higher than that required to prevent deficiency symptoms.



SULFUR-COATED UREA FOR TURFGRASS FERTILIZATION

N W Hummel Jr and D V Waddington

Soil Science Journal Vol 48 Number 1 191-195

Sulfur-coated urea is a slow-release nitrogen source that has gained a favorable reputation for turfgrass fertilization. Data concerning most efficient rates of application and best timing of treatments for different sulfur-coated urea materials has been obtained from research in Pennsylvania.

Three sulfur-coated urea materials were used for maintenance fertilization of Merion Kentucky bluegrass. Dissolution rates of materials tested varied from eleven to thirty percent. Comparison treatments included ammonium nitrate, Ureaform and IBDU. Two months after application of sulfur-coated urea, dissolution ranged from 91 to 97 percent for the 30 percent material and 38 to 53 percent fo the 11 percent material. Recovery of applied nitrogen in clippings was greatest for ammonium nitrate (49 to 59 percent) and the high dissolution rate sulfur-coated urea (50 to 56 percent). Only 25 to 37 percent nitrogen recovery was obtained from the low dissolution rate sulfur-coated urea. Recovery of 22 percent nitrogen for Ureaform and 46 percent for IBDU was determined.

RESPONSE OF BERMUDAGRASS TURF TO WINTER-APPLIED HERBICIDES

B J Johnson

Weed Science Vol 32 Number 4 477-482

In the southern United States, warm-season grasses grow slowly or are dormant during cool weather and winter weeds are abundant. Mild winter temperatures favor weeds and use of herbicides is necessary. Preemergence herbicides applied during winter months are known to delay bermudagrass growth the following spring. Postemergence herbicides applied in late winter generally do not delay bermudagrass growth.

Tifway, Tifgreen, Tifdwarf and Ormond bermudagrasses grown in the Piedmont region of Georgia were treated with split applications of Paraquat, Dicamba and 24-D plus Dicamba on February 2 plus February 16 and on February 16 plus March 3. Turf was weed free at the time of treatment; bermudagrass response was noted. Paraquat applied to dormant turf in February delayed growth of bermudagrass in April. Tifway and Tifdwarf tended to be more sensitive than Tifgreen and Ormond. Dicamba applied alone or with 24-D delayed turf growth more than 24-D alone.

P.O.BOX 108

(Industry Wide News and Views)

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14

PVP

IMPROVEMENT THRU RESEARCH

A Plant Variety Protection Act brochure was developed as a combined effort of the American Seed Trade Association, PVP Committee to inform farmers, dealers and various agricultural institutions of the benefits of the PVP Act, which was established as Federal law in 1970.

An informative brochure was designed for convenient distribution to those who may directly benefit from the PVP Act.... including most farmers.

The Plant Variety Protection Act symbolizes the identification of the plant variety protection of the seed product. Now, newly developed plant varieties can be registered and protected for a period of 18 years. Used in conjunction with "IMPROVEMENT THRU RESEARCH", the PVP symbol exemplifies the product benefit to both farmers and dealers by research-oriented companies. Because the companies' development investment can now be protected under the PVP law, their efforts at developing new and improved varieties for the marketplace have been dramatically improved. The identifying symbol reflects the characteristics of progressiveness and scientific orientation of today's seed industry.

The Plant Variety Protection Act became law December 24,1970. As s_ated in the preamble, it is intended "To encourage the development of novel varieties of sexually reproduced plants and to make them available to the public, providing protection available to those who breed, develop, or disco-er them and thereby promoting progress in agriculture in the public interest."

When you purchase an outstanding variety you are buying research. Research that has enabled seed companies to replace many varieties with better, more cost effective products. These new varieties can boost grower's yields, reduce per unit production costs and improve efficiency.

The Act provides a developer means for securing legal protection of new plant varieties which reproduce sexually - by seed.

The variety must be distinctive, uniform and stable to receive a certificate.

The Act places limits on the reproduction and selling or offering for sale of a variety by anyone other than the developer.

With PVP, the developer has an opportunity to recover costly research investments provided the seed developed meets the demanding test of the marketplace.

Seed sales provide the only avenue for private developers to recover extensive genetic research investments and provide funds for future research.

The Act prevents others from engaging in the seed business with a protected variety without permission of the variety's owner.

If a seed or farm supply company takes a protected variy, reproduces and sells t r offers it for sale, that is a violation of the PVP Act.

A farmer growing crops primarily for seed is also prohibited from selling or offering for sale protected varieties developed by others. An exception to the Act permits a farmer to save his own seed. This exemption allows seed sales under limited circumstances. The exemption does not extend to advertising. Such farmer to farmer sales must comply with applicable state seed laws.

The PVP Act brochures are available for immediate distribution. For convenience, they are bundled in individual packages of 100.. Orders can only be accepted in multiples of 100. There is a small cost for this brochure of 3 cents per copy, so be sure to calculate this cost when ordering.

To obtain your copies, simply forward your request, along with a check or money order to: PVP 100, American Seed Trade Assocation, Suite 964, Executive Bldg, 1030 15th St NW, Washington, D C 20005.

Conference Topics

(Presentations of note)

7TH ANNUAL NEW BRUNSWICK TURF SEMINAR

SPORTS TURF ~

Do It Right the First Time

Dr James Watson

Toro Company
Minneapolis, Minnesota

For many years, sports turf has been of special concern to Jim Watson, Agronomist with The Toro Comany. Because sports are important in this country, the condition of the playing surface is a topic for frequent discussion. Good footing and fair play of the ball help take "luck" out of the game. Winners are determined on the basis of skill. In addition, good footing reduces injuries. The smooth surface of a turfed field increases sports safety.

The following are considered a must by Dr Watson in the development and maintenance of sports turf:

Use

- Intensively used sports fields often accomodate five or six different types of games.

- Traffic {use} of the field is damaging, particularly during wet weather.

Spectators

- Television has increased the importance of spectator point of view. What does the field look like ?

- To the spectator, the condition of the grass may be secondary in importance to appearance. Green is looked for.

- Patterns made by the mower are noticed by spectators. This tool can be used to enhance the esthetic appeal of the field.

- Different tints and dyes help make sports turf look better.

- Sweepers that remove clippings and other plant parts before they turn brown improve field appearance.

- Poor fields that are filled with annual weeds or clover or have bare spots are difficult to make look good.

Athletes

- The player values firmness of footing that is uniform and even. To maintain this, topdressing is needed as a regular maintenance practice.

- Footing requires a good solid turf cover.

- Color of the grass is not particularly important.

- Injury on poor fields is more frequent, particularly ankle and knee sensitivity in younger players.

Conference Topics CONTINUED

Sports Turf continued

Causes of Sports Turf Failure

- Three critical conditions are responsible for sports turf failure:

  - poor soil conditions;
  - poor grass adaptability;
  - poor management (cultural practices).

- Compacted soil results in poor aeration and shallow roots under weak grass.

- Sports fields with poor surface and internal drainage have weak grass because of unfavorable soil-air-water relationships. Many fields of this type need tile.

- Sand fields resist compaction and have more favorable drainage characteristics. The type of sand used is important. Twelve to fourteen inches of medium textured sand works well. Largest sand particles are forty times bigger than the smallest sand particles. Thus, there is a big difference in sands (2.0 to .05 mm). Some sands are rounded; others are sharp. Small sands and coarse sands should be avoided. Use sands within the range 1.0 to 0.1 mm. Ideally, seventy five percent of the sand should be between 0.25 and 0.50 mm. The sand should contain from five to ten percent clay and the clay to silt ratio should not be more than two to one. Both physical and chemical properties should be described by a soil test.

- Tile lines in pea gravel with three to four inches of gravel on top and covered with a layer of coarse sand one to two millimeters in diameter are installed prior to covering with the sand rootzone medium. Tile lines are placed lengthwise of the field twenty feet apart. Plastic lines with holes work well.

- Surface contours on sports fields are not only important for proper play of the game but also as an aid in establishing good surface flow of moisture away from the game area. Football fields should have an eighteen inch crown. Soccer fields have no crown but should be provided with a slight slope from center field to sidelines.

Improving Poor Sports Turf

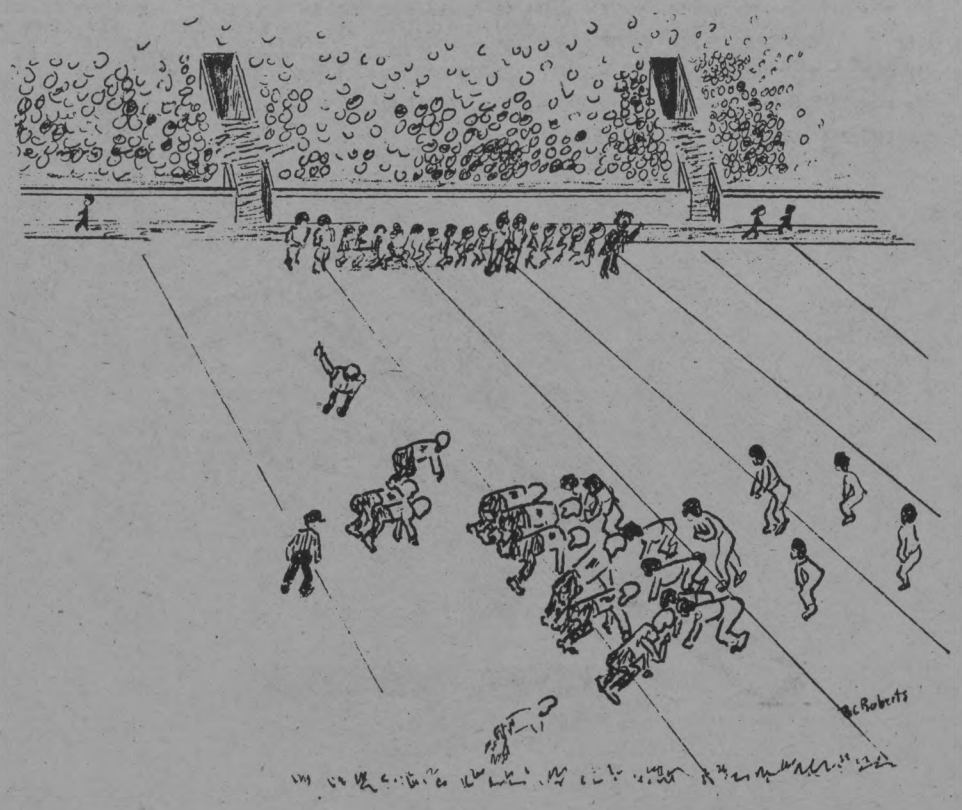
- Corrective practices for a poor field must start at the end of the playing season. A spring start on a fall damaged field is too late.

- Tough wear resistant grasses not torn by cleats must be used, such as perennial ryegrasses. These work well in a bluegrass base because the ryegrasses fill in from overseeding as the bluegrass is worn out. Some seed mixtures include three bluegrasses and two ryegrasses. Sod from these same mixtures works well.

- Sod for a sandy field must come from a sandy sod field.

- Sod one and one half to two inches thick in three foot strips one and one half foot wide laid like bricks on the field works well. These strips are heavy and must be handled with care. They are tamped in place, topdressed, fertilized and watered. Sod that is too thin tears easily and creates a poor footing.

- Seeding a baseball infield may require twenty to twenty five pounds of seed per one thousand square feet to produce a firm, stable surface. Moisture level in the soil is of critical importance - not too much; not too little.



Conference Topics CONTINUED

Sports Turf continued

- Bluegrass and ryegrass seed may be placed on the field so that it is cleated into the soil by the players. In this way, excellent seed to soil contact is attained as footware punches seed into the soil. High rates of seeding are recommended.

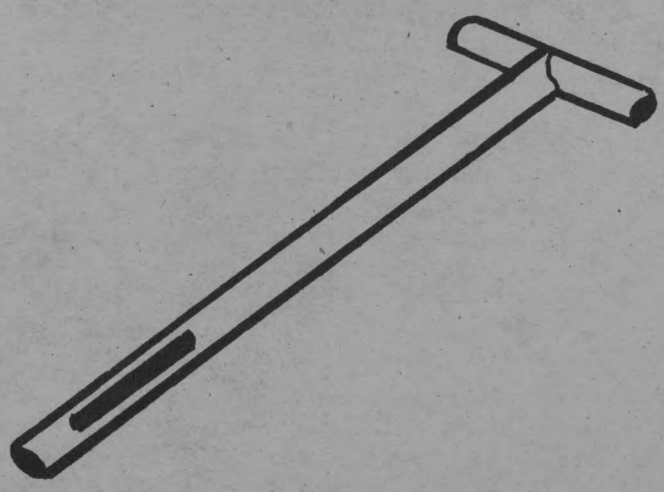
- Since turf is a product of the grass planted, soil suitability and proper cultural practices, all three work together to produce quality sports turf.

- There are from five to seven thousand species of grasses, but only forty to fifty species suitable for turf and only four or five used in any one location. Some grasses are bunch type; others are stoloniferous; and some are rhizomatous. All grow from a crown base. Perennial ryegrasses have a low growing point in the soil and thus are good for sports turf.

- Grasses used in any location must be well adapted to prevailing climatic conditions. How well they are adapted may also depend on physical and chemical soil properties and on use and play demands on the field.

- Soil tests for pH, soluble salts, nitrogen, phosphorus and potassium are necessary each year. Take samples from two and six inch depths.

- Soil tests for physical properties, such as texture, porosity, bulk density and organic matter, will provide information on structure, air-water relationships and proneness to compaction.



- Topdressing freqently helps keep the surface even. A lot of material is required. Core cultivation helps prevent layering.

- Mowing practices are important. Height of cut is determined by play of the game. Frequency of cut is regulated by type of grass and height requirements. Mowers must be kept sharp. Mutilated blades do not grow as rapidly as those clean cut.

- Fertilizer applications merely supplement what's in the soil. Thus, a soil test is necessary. Nutrient balance is important. Nitrogen is the key element. Applications must be made uniformily. Spread fertilizers at half rate in two different directions.

- Irrigation practices are based on the needs of the turf. Soils must not become saturated; neither should they reach the wilting point. Field capacity watering is influenced by soil texture. Sands hold less water than heavier soil. Their reserve capacity is less. On the average, water loss amounts to about three tenths of an inch a day. Soil-water holding capacity, temperature and factors regulating growth influence how much must be replaced and when.

- Cultivation includes coring, spiking and slicing. These practices are essential in reducing the effect of soil compaction on the turf. Bands compact the soil in lines down the field that conform to march patterns. Players along the side lines compact the soil just off the playing surface. Player traffic out of the shoot and onto the field compacts the soil in that region. Portable stands, fireworks, rock concerts and all sorts of special events, other than play of the game, cause soil compaction in distinct patterns.

- Pesticides used at the proper time for control of weeds, insects and diseases are part of sports turf culture.

PLCAA REGIONAL SEMINAR, ATLANTA GA
AUGUST 14,1984

Management Practices to Help Control Diseases

Dr Leon Lucas

North Carolina State University
Raleigh NC

With an increased realization that pesticides have detrimental effects on turf as well as beneficial, more study is being made of improved management practices to lessen the severity of disease infection. In the transition zone and on into the warm, humid region, tall fescues, bermudagrasses, zoysiagrasses, centipedegrasses, St Augustinegrasses and crabgrass make up most lawn turf. Dr Leon Lucas, Plant Pathologist at North Carolina State University has put together some facts he believes are important to consider in the management of turf that is less prone to disease infection.

- In North Carolina, like much of the transition zone, parts of the state are cool [west], parts are warm [east], and parts are in between and very unfavorable [middle]. No grasses are really native and it is a wonder that we do as well as we do.

- Conditions usually exist for favorable growth of something for about ten months. How can this be extended to twelve months ?

- The public is familiar with the Augusta National Golf Course and the quality of turf there. Unreasonable expectations for home lawns follow.

- Integrated pest management is helping to promote the use of chemicals intelligently. This program takes into consideration management practices and biological controls, as well as chemical controls.

- Management includes consideration of conditions related to:

  - soil mixtures;
  - time of seeding or planting;
  - fertilization;
  - irrigation;
  - mowing;
  - aerification;
  - verticutting;
  - use of proper cultivars.

Emphasis is placed on the fact that good, healthy turf is the best possible means of pest control.

- Turfgrass adaptability guidelines worked out for North Carolina include:

  - bluegrasses in mountain regions;
  - bermudagrasses in transition areas;
  - ryegrasses as wintergrass in transition areas;
  - turf type tall fescues in transition areas;
  - St Augustinegrasses along the east coast;
  - turf type tall fescues along the east coast;
  - centipedegrasses along east and south coastal regions;
  - Tiflawn 328 bermudagrass along east and south coastal regions.

These grasses in these locations will develop roots that will help tops take care of themselves.

- Pythium is related to poor drainage. Sand modification of soils helps. Contours that keep water off are desirable. Core cultivation with holes filled with sand is good practice.

- Brown patch on tall fescues is often related to excess moisture and lack of good air movement. These problems may be best solved at the time of construction - modify the soil - thin out trees.

- Physical and chemical soil tests can help solve seventy five to eighty percent of lawn probems. Realize that vinegar has a pH of about 3.0. Not many lawns grow well at this soil pH. Continued applications of lime may be needed. If it takes twenty tons per acre

Conference Topics CONTINUED

Management Practices continued

to get the pH up to 6.5, apply this amount over a period of time.

- Time of overseeding ryegrass is important. Seed when diseases are less active. In some locations, this may mean early fall (September fifteen to October first). Plant bermudagrasses in early summer because they need a full season to establish.

- Nitrogen use affects disease proneness. The gardener has more control of this than many other factors that influence disease infection. Nitrogen will turn centipedegrass green, but cold weather will then kill it. Less than one pound of nitrogen per one thousand square feet per year is needed for this grass. Brown patch severity is related to increased nitrogen, particularly on tall fescues. Use just enough to maintain color and reasonable vigor. December first is a good time to fertilize tall fescue. Applications of nitrogen in May promote top growth at the expense of roots. Dollar spot on bermudagrass is more of a problem when nitrogen is withheld. In this case, the nitrogen helps the plant grow out of the infection. Care must be taken not to apply too much or increased winter kill may be the result. Red thread disease on bluegrasses, ryegrasses and tall fescues requires that nitrogen be added to help infected plants grow out of the infection.

- Thatch is related to disease proneness of the turf. Too much nitrogen helps create thatch. The more thatch, the more likely turf is to become diseased.

- Traffic on lawn and sports turf weakens the grass. Centipedegrass is particularly sensitive to traffic.

- Too much or too little water can cause stress that weakens the turf. One inch of water a week is usually about right. Soak the soil to a depth of six to eight inches. Light watering encourages the development of shallow roots. Such weakened turf with wet leaves is more prone to disease. Early morning watering gets exodates off leaves and helps prevent disease. Late afternoon watering creates wet conditions overnight. These are often associated with more disease.

- Core cultivation encourages root growth. The healthier the roots, the less disease and the easier it is to control that which does get started.

- Biological control methods are important. These include use of resistant varieties. The cultivar may be more tolerant of or less prone to disease or may simply recover more quickly. Insects open the door to diseases and diseases open the door to weeds. Many microorganisms are beneficial as they affect other, often harmful, types.

- Chemical controls are needed where the disease has gotten a start after all management practices have been improved to increase plant resistance. It's normal for this to happen. Many good fungicides are available for each disease. Disease control methods involve use of a small droplet, a fine mist, that sticks to the leaves. One half an ounce per acre is a very small amount of chemical to apply evenly. Uniform application is a must. Repeat applications may be necessary. Use of fungicides on lawns can be more expensive than all other lawn care practices put together.

- In order to effectively use fungicides, accurate diagnosis is of critical importance.

- Realize that the landscape changes with time- trees change; shrubs change; these changes affect disease proneness of the lawn. Trees may be removed or limbs selectively pruned or areas under them planted to broad leaved ground covers or mulched. Leaves must be raked and removed to help prevent disease.

-Manage pests properly or the lawn will be "Gone With the Wind" - Weeds, Insects, Nematodes, Diseases.

'When tillage begins, other arts follow. The farmers, therefore, are the founders of human civilization'

- WEBSTER

PLCAA REGIONAL SEMINAR, ATLANTA GA
AUGUST 14,1984

Buying Quality Seed

An Update on Turf Type Tall Fescues

Joe O'Donnell

Sun Belt Seeds
Norcross, Georgia

The matter of buying quality lawnseed is of importance to both the seedsman and the consumer. Joe O'Donnell of Sun Belt Seeds has outlined the following points to consider in purchasing the new turf type tall fescues:

- Tall fescues are not new. They have been used for years as a pasture grass, in soil conservation practices and for turf.

- Tall fescues have been recognized as:

  - tough coarse grasses;
  - bunchgrasses;
  - deep rooted grasses;
  - drought tolerant grasses;
  - heat tolerant grasses;
  - grasses with wide soil adaptation;
  - shade tolerant grasses;
  - having shoots that tiller out from the base.

- New turf type tall fescues are being developed that have:

  - short rhizomes;
  - increased density;
  - some tendency to spread;
  - finer texture;
  - lower habits of growth;
  - more disease resistant.

Release of new turf type tall fescues includes:

1979	Rebel
1981	Falcon Clemtine
1982	Houndog Olympic
1983	Mustang Galway Jaguar Adventure Finelawn

Within a year, some eighteen varieties should be available on the market.

- Uses of new turf type tall fescues include:

  - as a replacement for Kentucky bluegrass;

  - as a replacement for Kentucky 31 fescue;

    - for finer texture;
    - for better seed quality, including freedom from weed and crop seed, better germination and more vigor. (Samples of Kentucky 31 fescue may have some 1.2 % other crop seed, often orchardgrass, and 0.2 % weed seed. Turf type tall fescues may have some 0.06 % other crop seed, often ryegrass, and 0.0 % weed seed.)

Conference Topics CONTINUED

Buying Quality Seed continued

- An evaluation of cultivars now on the market reveals:

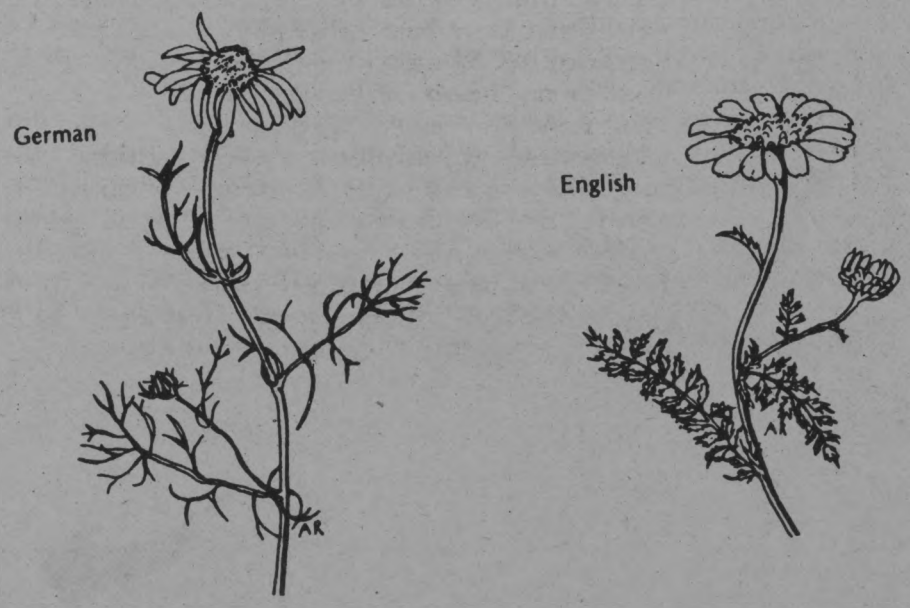
- color is excellent;
- texture is good but still a little coarse;
- density is improved with more tillers and more leaf blades;
- uniformity is superior with much less tendency to clump than Kentucky 31 fescue;
- disease resistance is better than Kentucky bluegrasses;
- germination is comparable to Kentucky 31 fescue, faster than bluegrasses but a little slower than perennial ryegrasses;
- establishment rate is very good;
- seed quality is excellent - professionally grown in Oregon;
- seeding rate is about eight pounds of seed per one thousand square feet compared to twelve pounds for Kentucky 31 fescue;
- hydroseeding gives good results;
- shade tolerance is better than most bluegrass, but less than fine fescues.

- Turf type tall fescues have relatively large seed (225,000 seed per pound) compared with bluegrass seed (2,000,000 seed per pound). Close to ten bluegrass seeds are equivalent to one fescue seed. Thus, to formulate a mixture of about equal proportions of fescue to bluegrass, ninety percent fescue and ten percent bluegrass would be used. Even this small amount of bluegrass may in time dominate the turf type tall fescue turf. In the south, this amount of bluegrass is less likely to take over.

- Turf type tall fescues germinate faster in the fall when temperatures are lower. They establish well at these times.

- Seed availability is increasing. Shortages of the past should not continue into the future as new fields are harvested to meet increasing demand.

Chamomile



Chamomile

"Chamomile lawns were popular long before our familiar grass lawns, one explanation being that until the mid-nineteenth century, grass seed was difficult to get. It is thought that Drake was in all probability playing bowls on a Chamomile lawn on Plymouth Hoe, when the Spanish Armada was sighted.

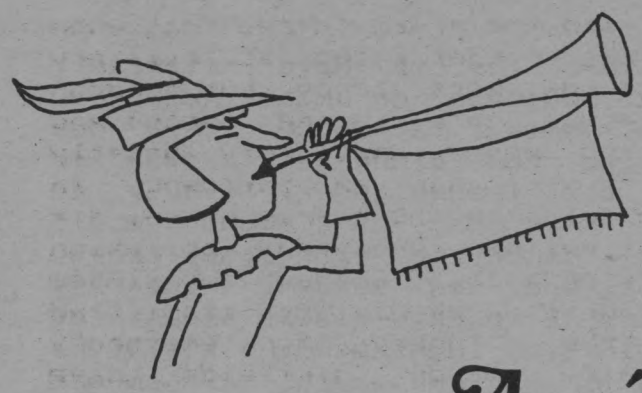
'Beautiful Chamomile', according to the Elizabethan poet Spenser, 'the more it is trodden on, the better it grows'."

-Everybody's Home Herbal
Ceres

Lawn Institute Pitch

(Discussion of Current Issues)

Warvests 22



A Tribute To Turfgrass

by

James H Boyce Turfgrass Consultant,Canada

"GRASS"

"Next in importance to the divine profusion of water, light and air, those three physical facts which render existence possible, may be reckoned the universal benificence of grass. Lying in the sunshine among the buttercups and dandelions in May, scarcely higher in intelligence than the minute tenants of that mimic wilderness our earliest recollections are of grass; and when the fitful fever is ended and the foolish wrangle of the market and forum are closed, grass heals over the scar which our decent into the bosom of the earth has made, and the carpet of the infant becomes the blanket of the dead.

Grass is the forgiveness of Nature-- her constant benediction. Fields trampled with battle, saturated with blood, torn with ruts of cannon, grow green again with grass, and the carnage is forgotten. Streets abandoned by traffic become grass-grown, like rural lanes, and are obliterated. Forests decay, harvests perish, flowers vanish, but grass is immortal. Beleaguered by the sullen hosts of winter, it withdraws into the impregnable fortress of its subterranean vitality and emerges upon the solicitation of spring. Sown by the winds, by wandering birds, propagated by the subtle horticulture of the elements which are its ministers and servants, it softens the rude outlines of the world. It invades the solitude of deserts, climbs the inaccessible slopes and pinnacles of mountains and modifies the history, character and the destiny of nations.

Unobtrusive and patient, it has immortal vigor and aggression. Banished from the thoroughfares and fields, it bides its time to return, and when vigilance is relaxed or the dynasty has perished, it silently resumes the throne from which it has been expelled but which it never abdicates. It bears no blazenry of bloom to charm the senses with fragrances or splendour but its homely hue is more enchanting than the lily or the rose. It yields no fruits in earth or air, yet should the harvest fail for a single year, famine would depopulate the world".

-Anonymous

The above was written many years ago and so many persons have claimed authorship, including more than one U S Secretary of Agriculture, that it is impossible to give credit with any degree of accuracy. Whoever the author was, he certainly was well acquainted with the importance of grass to the human race, although one might question the statement "it yields no fruit in earth or air..." since the seed of such cereal grains as wheat, oats, barley, rice and rye and kernels of corn are, in the strictest sense of the word, fruits and all belong to the grass family.

A Tribute To Turfgrass continued

Reference to grass may be found in the Bible and other literature throughout the ages. Aside from its immense contribution to farm and field in producing fodder for animals and grains for both human and animal nutrition, grass plays an extremely important role in the production of turf for the comfort, recreation and the sense of well-being of the majority of the population. Almost everyone has an interest in turf, whether it be the home lawn, park, sports field, golf course or simply as a covering of a cemetery plot. Because of the increase in population and of the technological advances which permit more leisure time for most, the importance of turf is increasing phenomenally. There are large housing developments, great increases in the numbers of golf courses and other recreational areas and in highways to move people from one to the other. All are dependent on turf for much of their effectiveness. The purposes of turf may be classified as: a) utility or functional; b) recreational; and c) ornamental; and d) monetary.

Among the utility or functional uses are the control of wind and water erosion of soil which is essential to the reduction of dust and mud problems around homes, factories, businesses and schools. It was noted during war-time work with the armed forces that when mud and dust went uncontrolled at military bases, the personnel were sloppy, but as soon as all bare areas were turfed, dress and military bearing were immediately greatly improved. Turf also has an influence in climate control; it reduces glare, noise, air pollution, heat buildup and visual pollution problems. Turf on highway medians and slopes make for safer driving by giving a stabilized surface off the highway for emergency stopping. While major airfields have hard-surface runways, it is important that the areas alongside these runways be turfed, if only to prevent ground loops if the aircraft leave the runway. At the same time, reduction of the dust problem protects airplane motors and precision equipment. Smaller airfields depend entirely on turf for landing and take-off.

From the recreational standpoint, many sports depend on turf for their usefulness. These include baseball, cricket, croquet, field hockey, football, golf, lawn bowling, lawn tennis, lacrosse, polo, racing, rugby, skiing and soccer. The contact sports, such as football, soccer and rugby, are served best by turf because of its resilience and heat reducing properties.

From the ornamental standpoint, turf provides beauty and attractiveness for human activities. Such aesthetic values are of increasing importance to counter the stresses of modern day living.

And, no one can deny that as soon as a property has been turfed, it increases greatly in value - far more than the initial investment in turf.

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ASSOCIATE EDITOR'S NOTE:

This edition of Harvests was done on the Perfect Writer word processor program on our son's Kaypro II computer. The program had been configured to doublestrike in order to have the copy as dark as possible when printed on the Gemini-10 dot matrix printer. Having the right margins justified will give a new look to the tabloid. We will welcome any comments on readability and base our decision on continuing this format on the feedback. The Perfect Filer program has been used to generate labels for Harvests and Press Kits for some time and this has allowed us to expand our mailing lists and still have labels in zip code order for bulk mail. Any incorrect mailing addresses can be corrected directly on the mailing label and returned for corrections. We appreciate your help in keeping us up-to-date.

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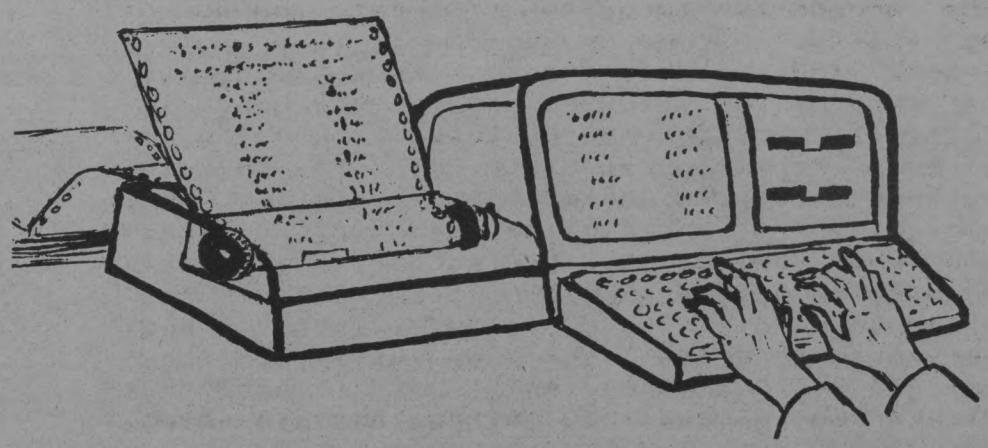

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The Better Lawn and Turf Institute is incorporated as a nonprofit business league formed exclusively for educational and research purposes concerned with agronomic, horticultural and landscape concepts.

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

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