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LAWN
INSTITUTE



Harvests

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THE HARVEST MIX

Several turfgrass and related topics are presented in this issue. The benefits of fine turf need to be emphasized more. Daily headlines focus on risks, including pesticides. A review of some current literature on risk assessment and a review of a recent booklet on pesticides are food for thought. Two talks from the June 1987 American Seed Trade Association Convention are briefed. Competition between turfgrasses and woody plants and a look at root development are presented in two other articles. Industry trends, Variety Review Board recognized cultivars, and southern turfgrass cultivar development are also featured.



The **HUGE** Impact



of Those TINY Lawngrass Plants

by

Eliot C Roberts
The Lawn Institute
Pleasant Hill, Tennessee

One plant from your lawn or from the city park where you enjoy lunch is small when you think of many of our other landscape plants. A maple tree can be some 30 feet tall and its canopy may shade an area of 1,000 square feet. It's amazing that a lawngrass plant is only allowed to grow 1 - 2 inches tall and then we cut it back taking away much of the food factory necessary to its life. We even cut off its potential to flower - its reproductive capacity. Still, the grass plant grows, spreads its roots into the soil and sends up more shoots.

If one turfgrass plant is plucked for viewing, it isn't too impressive. It isn't very strong under the prodding of fingers. It isn't a plant to display in a bud vase. But, it is impressive when banded with 5 others in each square inch of lawn resulting in a turf of over 850 plants per square foot or almost a million in each 1,000 square feet of lawn. This green grass army protects us, pleases us, enhances the environment and even puts money in our pockets.

What then are some of the benefits of a well maintained turf?

Monetary

Value of real estate: A recent Gallup Survey concludes that a well maintained lawn has monetary value. When combined with good design and landscaping, a 15 % increase of home value or selling price can be realized. Increases in business property values are also recognized.

Appraisers estimate well designed and maintained landscape added 7 % to value of residential property and 6 % to commercial property.



The Gallup Survey also reported that 62 % of all U S homeowners felt investment in lawns and landscaping is as good or better than other types of home improvements. The recovery value is 100 % - 200 %, compared to an investment such as a new deck or patio at 40 % - 70 %.

Health

Noise abatement: Landscape vegetation, including turfgrass, helps muffle objectionable street noise. Sounds that do penetrate lawn and garden areas are rendered softer and less irritating. Lawns and gardens are restful places to enjoy the out-of-doors.

Control of temperature buildup: Turf has a cooling effect. Lawns remain about 75 degrees F when atmospheric temperature exceeds 100 degrees F on driveways and sidewalks. This temperature reduction helps make lawns and gardens pleasant places on hot summer days. Since they never become as hot during the day, further cooling during evening hours is most enjoyable.

Sun glare control: Green of lawn and landscape plant foliage produces a pleasing background setting for residential living and business and commerce complexes alike. Bright sunlight is made more comfortable as glare is reduced.

Allergy control: Mowing turf helps control dust, pollen from weeds and grasses, seeds, spores, and biting and stinging insects. These sources of irritation bring about allergic reactions that are highly uncomfortable. Lawns help reduce the causes of allergies.

THE HUGE IMPACT continued

Cushioning: Turf on home lawns, playgrounds and sports fields feels good to walk or run on. There is a resiliency that helps keep legs healthy. In addition, this cushioning effect makes natural turf comfortable to sit or recline on. It's a good surface for play from roughhouse to football.

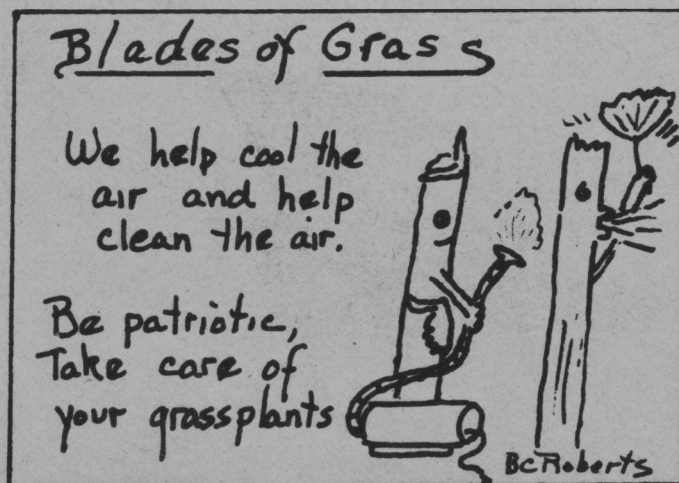
Safer footing: Natural turf provides for good traction between the ground and the shoe sole. This means safe footing on home lawns, playgrounds and sports fields. A sod cover helps keep shoes from contact with loose stones and slippery wet soil that are often responsible for unexpected falls.

Small animal control: Well maintained lawns around residential and commercial buildings help control populations of chiggers, ticks, ants, snakes, rodents and other small animals. These pests find more protection in the natural landscape and thus become more troublesome in the absence of fine lawns.

Aesthetic value: Lawns provide the ideal background for the most pleasing landscape possible. A well maintained lawn is first of all uniform in appearance from front to back and from side to side. It's green surface serves to emphasize and never detract from other features of the landscape.

Health enhancement: Roadside rest stops, parks, cemeteries and home lawns are all conducive to good health because they provide settings that help to reduce stress. In addition, lawn tending provides the best in walking, bending and lifting exercise to promote good health. Out-of-doors gardening is far superior to physical fitness workouts indoors.

Response to natural drive: Many believe that lawns and gardens are important because they are the result of a natural internal drive to form a savanna type habitat similar to that from which human kind has evolved. As there is variation in all people, some express this drive more directly than others.



Environment

Erosion control: Turfgrass roots penetrate into the soil and hold particles so that they are not lost by wind and water erosion. Topsoil takes thousands of years to develop. It is lost quickly by erosion. Lawns protect our natural soil resource.

Entrapment of particles: Particulate matter is continually falling from the atmosphere. This dust plus solid pollutant particles also includes pollen, spores and wind blown seeds. These are all trapped by lawn turf so that they do not reenter the atmosphere.

Oxygen generation: All living green plants take carbon dioxide out of the atmosphere and replace it with oxygen essential for our health and longevity. Lawns contribute their fair share to the maintenance of air that is fit to breathe.

Water purification: The biology of turfgrass soils makes lawns a near ideal medium for the biodegradation of all sorts of environmental contamination. These soils are active in water purification as it leaches through the rootzone and down into underground aquifers.

Soil building: Lawngrass roots are constantly developing, dying off, decomposing and redeveloping. This process builds humus, keeps soils microbiologically active and over time, improves soils physically and chemically. World wide grassland soils are best in terms of productivity.

Fire retardant: Healthy green turf will not sustain fire as dense woody vegetation does. Thus, where landscapes are prone to frequent uncontrolled burns, a buffer zone of lawngrass around buildings is good insurance.

Perhaps the greatest benefit of all has little to do with monetary matters or health or environment. It is simply fun. There is great satisfaction gained from creating beautiful surroundings. All people have some degree of creative genius. More and more this is being expressed through landscape design and gardening. And, the fact that there are monetary, health and environmental benefits is indeed an added value.

LET'S FACE IT~

LIVING IS RISKY !

by

Beverly C Roberts
The Lawn Institute
Pleasant Hill, Tennessee

TV has brought us glimpses of the old silent movies where the heroine is tied to the railroad and the train is seen coming down the track. Danger is at hand and the audience gasps. Will the hero save her? Movies today are much more complex with monsters and elaborate graphic tricks to make dangers so mind boggling that the solution is not evident. Audiences spend millions to experience these risks in movie theaters or at home on TV and VCRs. We seem to have a fascination with these "on screen" dangers, knowing that our personal risk in a comfortable seat is nil.

Avoiding harmful situations and conditions is basic to the survival of all living organisms. Each day as we approach our activities, we face uncertainties, determine the risks involved as we perceive them and make decisions about how to avoid or reduce the risks.

Every step we take involves risks. By the time we get to work in the morning, we have showered, shaved, dressed, perhaps walked downstairs, gotten breakfast and traveled some distance. These acts have presented numerous risks, however small. The risk of electrocution when turning on a light [200 people in the US die each year in accidents involving home wiring]. The risk of falling on the stairs [7000 people, most over 65 years of age, in US die each year in falls in homes]. The risk of eating breakfast [many foods and water contain alleged carcinogenic chemicals]. Even table salt is toxic if a high dose is taken at one time but, at the same time, salt is essential to daily life in small doses. Two tablespoonsful could kill a one year old child and yet salt is on most dining tables. There is risk in driving an automobile [in 1985, 45,000 Americans were killed on the highway]. We face these same risks over and over, day in and day out. We have to find ways to minimize our risks and so automatically we hold on to stair railings, choose our foods, and fasten the car seatbelt.

We are exposed to many risks each day, which in small doses over a lifetime might be cancer causing - water [chlorinated or contaminated], cooked food and beverages, food additives, air pollution in and out of our homes, common drugs, and occupational hazards. The number of minimal risks to humans, for instance in the diet, is huge. Many are natural carcinogens found in foods and some are formed during preparation of food. We live surrounded by hazards, but that has been a part of life since the beginning.

Risk Assessors

In business and government, professional risk assessors use a variety of techniques to try to calculate risk factors for various hazards. Insurance companies base their rates on such data. The Environmental Protection Agency [EPA] is only one segment of the U S government which uses risk assessment techniques to set priorities, adjust regulations and make site specific decisions. Risk assessment is a tool that helps set current priorities that specify hundreds of toxic chemicals for some form of regulation. There are other alternatives to approaching these issues. All methods for evaluating risks have associated limitations and problems. Some feel the risk assessment approach is too conservative and leads to over-control. Others argue that the techniques do not go far enough.



LIVING IS RISKY continued

How Risk Factors Are Determined

One key defense mechanism we use to protect against hazards comes from learning from experiences and modifying and responding to the environment. When new situations arise, the uncertainties are also new and the risks have to be assessed. Disagreements between people arise as to how to determine the risks as well as how to interpret any information that is available.

The task is easier when there is historical data to work with. In the case involving safety of riding in automobiles compared with riding on horses, not only can valid risk estimates be made but then comparisons can be made between the two modes of transportation.

Various methods are used to assess health risks as related to new hazards. Cancer risk figures are often based on experiments using large doses on small test animals then results are extrapolated to provide estimates of risk on humans. A lot of data has been developed as a basis for priority setting but knowledge of the various factors involved in the human body's response to various substances is limited. Caution is expressed by researchers about using various indexes based on test animal experiments as a definitive estimate of human hazard. This type of procedure is controversial but is widely used to form risk estimates and comparisons between risks.

Rules always have exceptions. When a chemical is found to be harmful at a high rate in one dose but necessary for human life in small doses, the usual rules are not followed. Vit D is highly toxic if taken at a high rate all at one time, but because humans need 400 I U daily, it is exempt from being labeled as a poison.

Risk assessments about chemicals are based on specific chemicals and not a number of chemicals which more realistically represent human exposure. Also other chemicals may interact with high risk chemicals and change the effects. Certain individuals of course are extremely sensitive to particular substances and thus risks for them are far greater than for the general population.

Cost is always a consideration. Controversy over mandating air bags in automobiles is an example. The cost of saving one life has been estimated to be about one million dollars. What is the worth of one human life? How much are we willing to pay?



Risk assessment, then, is clouded by partial truths and extrapolations from test animal experiments. The resulting costly policies created to "protect" us can sometimes divert our attention from really serious hazards. Generally risk assessments overstate the true risks.

Communicating Risk Factors to the Public

The objectives of research on risks and perceptions of hazards include: improved communications between the public and policy makers, educational programs, prediction of public responses to new technology and new strategies for managing risks.

Government officials are not at ease communicating to the public about the risks of an industrialized society and people are uncomfortable receiving such information. The American public seems to want a 'zero-risk society' and confusion results from the conflicting desires for equity, justice, prosperity and environmental quality. It is obvious that life styles vary considerably from zero-risk to high-risk.

Lists of high risks are published frequently. These are based not only on the order of the risks but also on the certainty of information available. Statistics on risks, even when valid, may not deal with all ramifications and can be misleading. The media tries to translate scientific language into more easily understood terms and often misinforms the public of the real findings.

When a governmental department using risk assessment techniques does come to some conclusions about a particular situation, the basis for risk is communicated to the public and if there are differing views/values, the issue becomes highly political. At times, even before an agency completes its investigations on a potential hazard, rising public interest creates a demand for federal and state action. When states begin to adopt individual 'safety' standards for compounds that might cause difficulties in humans, each area's regulations may be different, which in the case of food then serves to disrupt the national food distribution system and interferes in interstate commerce.

Public Perception and Understanding

Research is being conducted to aid policy makers, and regulatory departments in their understanding of how people think about and respond to risk so that policies might be more effective. Social and cultural factors, influences by friends, family, fellow workers, public officials and media seem to result in people downplaying certain risks and focusing on others. Risks are often misjudged and strong opinions held on the basis of biases, even in the presence of new and fact-based evidence, which then is dismissed as unreliable. When there is a 'hidden agenda' or grounds for concern other than the degree of risk involved in a debate, [other ideological/social concerns] communication about the risk statistics becomes irrelevant.

For the public, estimating risks from the various partial pictures presented by media and in printed reports is very difficult. Words such as "warning", "cancer", "poison", "results in illness" and "toxic" are emotionally charged and fear producing and are found daily in headlines. Public stress caused by an overdose of fear can be even more damaging to society than the feared chemicals.



A story on the fact that chlorinated tap water in the US contains chloroform [a by-product of water chlorination] creates concern. An individual with this fragment of knowledge has to decide - should I stop using chlorinated water? Should I find a source of non-chlorinated water even if it might have pathogenic organisms in it? Should I try to have chlorination of the water supply stopped? A little knowledge, one portion of the picture, can lead to concern, apprehension and even panic. Decision making needs to be based on as complete a picture as is available from many sources and perspectives. For instance, those who have access to such information now feel there is no reason to believe that the amount of chlorinated water consumed by a person poses a significant hazard.

It has been found that people tend to accept voluntary risks [controllable], such as mountain climbing and sports, that are many times greater than some involuntary risks [uncontrollable], like food additives and pesticides, even though benefits may be equal or even greater.

A person who smokes can take personal action to cut this risk and statistics on 350,000 tobacco related deaths a year are downplayed when this habit is accepted as part of one's life style. The way risks are expressed gives very different perceptions of the hazard. For instance, when it is stated that a non-smoking male in the US has a life expectancy of 79 years, this doesn't mean that all of this category will live to be 79 years of age. But with all the calculations available, the bottom line has impact - that smoking one cigarette reduces life expectancy five minutes.

The public, when studying risk lists, are often divided over which risks should be given the most attention. Public perception of the magnitude of risks is often based on the current focus upon the hazard rather than on over time averages. An accident [such as product tampering] has an impact far beyond the direct harm to victims. An event which is within a well understood system [ex: train wreck] even though many lives are lost creates less social disturbance than an event [ex: nuclear reactor] in a poorly understood system that takes no lives but is thought to be a signal of larger mishaps in the future.

Groups with certain interests in persuading the public to act on particular hazards usually use only the figures which bear out their point of view. Their objective is to mobilize policy making and often to collect money for use in reducing this risk.

DANGER

Judgement of risks by lay people involves characterizations, such as 'catastrophic potential', threat to 'future generations', etc more than just statistics on annual fatalities. Research has shown that generally people view many risk levels as being unacceptably high and that they are not satisfied with the way risks and benefits are being balanced through regulatory procedures. Even presenting new facts on an issue often has no impact when these come head on with strong perceptions and emotions.

Intuition plays a large part in an individual's judgement of hazards and is often based on media reports. A high risk practice not publicized may be easy to ignore. The same person may be highly concerned about another highly publicized, lower risk hazard.



When the benefits of a technology are perceived as being small in relation to perceived great risks, both for the present and in the future, a high level of concern is generated. This anxiety level can be linked to the amount of media coverage given the situation. But, reactions generally range from indifference to panic. We are more likely to hear about the panic than the indifference.

People living in industrialized societies perceive they are facing more risks today than during the past and that risks will increase in the future, even though in these same societies longevity and standard of living have increased. Current public concern, on the whole, is not closely aligned to estimated risk levels.

Pesticide Risks

During the last few years the media has focused our attention in sensational ways on pesticide residues in food, water and on the landscape. This has resulted in policy making, expenditure of funds and a high level of public concern. There is always the possibility of chemical mis-use and caution is advised. This is not the issue.

The entire story needs to be told. Which of the mass media "exposes" pointed out that "we are ingesting in our diet at least 10,000 times more by weight of natural pesticides than of man-made pesticide residues? Nature builds these chemicals into plants for their protection but little attention has been given these substances, although they are by far the main source of 'toxic chemicals' ingested by humans.

Pesticides may be dreaded most of all chemicals because some are aimed at killing living creatures [insecticides] and therefore associated more directly with poisons. Actually, turf pesticides, when used according to the directions, produce little risk to humans or the environment. Pesticides are listed as having a lower risk level than cars, swimming, bicycles, home appliances, power mowers and other normally used items.

Pesticides are mainly laboratory produced, although some are also produced by plants. The public perceives synthetic chemicals as being undesirable, complex and not biodegradable. There are few that cannot be broken down quickly, like some non-toxic plastics. Enzymes that our bodies produce are among the most complex chemicals known. Being man made and complex do not mean a substance is toxic.

Actually, much public reaction about any risk from turf pesticides is focused on the professional applicator because of the visibility of truck and uniform. Many home gardeners are untrained and have inadequate equipment and storage facilities for using the same chemicals. They pose a far greater risk to themselves and their neighbors than the lawn care professional.

Any chemical may cause illness under some conditions. Lethal accidents that are pesticide related have decreased each year with most of these now involving children swallowing the chemicals which are not stored properly or through careless handling practices. Very few are related to actual pesticide applications.

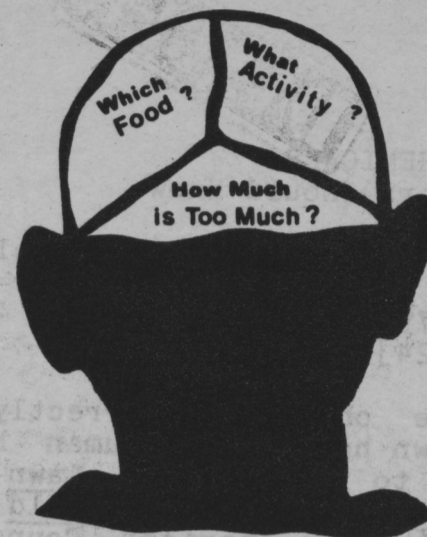
CONCLUSION

In our society, how many choices, which are hazardous, can individuals be allowed? In some states every hazardous turn and steep hill even on back roads have guard rails, but in other regions, the driver is left to maneuver safely or end up taking the consequences. Fireworks are dangerous toys and are restricted to public displays in many areas, but in a few states, fireworks are available year round, with no restrictions on use. In both of these cases, and others, individuals are responsible for their own safety.

There are other hazardous situations where individuals do not have the power to protect their own safety. The perceived risks of living near a nuclear power plant are considered by some a good example. Part of the public see such a hazard as life threatening and others feel that the risk level has not been increased very much.

"How safe is safe?" Which risks do we ignore and which do we try to reduce? When there is so much uncertainty in risk analysis methods and in the basic facts, and when the cost of risk reduction infringes on other benefits, including personal freedom, the decisions are difficult. Today's advanced methods of chemical quantification allow traces [1 part per billion] to be detected. These weren't even recognized a few years ago. There are scientific limitations in testing for all toxicity levels. It is very expensive to answer some questions and scientists cannot, even with new methods, verify the absolute safety of any substance for all people. Costs of regulation and enforcement of policies to reduce risks are high. Individuals look at risk situations in different ways so there is no one optimal policy for all.

In the final analysis, it is 'the public' that has the vote, and consumers, that decide how safe is safe enough. Collective decision making can be slow because of contradictory opinions. Balance is needed between created phobias/fears over chemicals which are of questionable risk and a fact-based approach to hazards proven to be of high risk to humans. Open minds are needed in order to assess all information on benefits vs risks, to discover biases in information and to make decisions that are good for society as a whole. It's not easy to find "the bottom line".



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New Booklet



LAWN CARE CHEMICALS:
What Consumers Should Know

American Council on Science & Health
47 Maple St
Summit NJ 07901
[201/277-0024]

"Lawn care chemicals, correctly used, pose no known hazard to human health, according to the report Lawn Care Chemicals: What Consumers Should Know, published by the American Council on Science and Health [ACSH], an independent scientific organization.

"Recent news stories have suggested that there are harmful effects from chemicals used to maintain healthy turfgrass and that additional regulatory controls on these chemicals, such as lawn posting laws or bans on common lawn pesticides, should be imposed. However, the scientific evidence does not support the proposition that more controls are needed." said ACSH Executive Director, Dr Elizabeth M Whelan.

"If lawn care chemicals were making people sick, the resulting illnesses would show up most often in people with the greatest exposure to them, namely commercial pesticide applicators, golf course personnel, and grounds maintenance workers," she explained. "Yet, so far no health risks have been demonstrated for these heavily exposed individuals as a group. In light of this, it is extremely unlikely that consumers, with their much lower levels of exposure, are suffering ill effects."

Much of the current controversy about lawn care chemicals has centered on the possibility that some people may have serious allergic reactions to them. "Given the public concern, it may be wise to conduct further scientific investigations of the allergy issue. However, the facts about allergies should be kept in mind," said ACSH Associate Director, Dr Edward G Remmers.

"Severe allergy due to lawn care chemicals seems to be rare or nonexistent. None of the usual lawn care pesticides is considered a major allergen. In fact, lawn pesticides probably prevent more allergic reactions than they cause because they reduce the numbers of insects and weeds."

Some consumers and Congress' General Accounting Office [GAO] have expressed concern about possible risks from 'older' pesticides for which chronic toxicity data are incomplete. "Although more information about 'older' pesticides might be desirable, we should not overlook the long, safe human exposure to these chemicals and experience with them," Dr Remmers said. "Congressional pressure to accelerate reappraisal of these pesticides is not likely to improve public health and serves to divert limited research and toxicology resources away from more critical and valuable research."

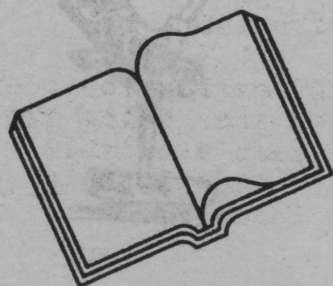
The American Council on Science and Health is an independent, nonprofit consumer education organization promoting scientifically balanced evaluations of food, chemicals, the environment and health.

The 36 page booklet addresses five major questions of interest to professionals and homeowners:

1. What are lawn care chemicals and how are they used?
2. Are lawn care chemicals safe?
3. Are lawn care chemicals safe and tested?: The GAO reports.
4. Risk reduction through lawn posting laws?
5. Do lawn care chemicals have benefits?

A number of issues about chemicals and possible health hazards are examined as well as proposals for risk reduction.

To obtain a copy of Lawn Care Chemicals: What Consumers Should Know, send a self-addressed, stamped [66 cents postage], business-size [no. 10] envelope to: Lawn Chemicals Report, ACSH, 47 Maple St, Summit NJ 07901.



COOL SEASON GRASSES

by

Dr Reed Funk
Rutgers University
New Brunswick New Jersey

ASTA-Lawn Seed Division
June 1987

Merion Kentucky bluegrass was isolated by Joe Valentine in 1936. The U S Golf Association, Green Section, USDA and Pennsylvania State University recognized its outstanding attributes and released this first improved cultivar. There have been over 700,000,000 pounds of Merion seed produced.

It takes many people and many years to produce a new variety. For example, it took 19 years to develop Rebel tall fescue to the commercial production stage. Many attributes are looked for in new cultivars, including the economy of seed production.

Kentucky bluegrass is still the cadillac of northern grasses but breeders have still to develop the best Kentucky bluegrass variety.

There is interest in developing better varieties of common Kentucky bluegrass, especially for dryland use. Attributes being sought include: economical seed production, early maturity, resistance to leaf spot and melting-out, lower growth profile, early spring greenup, adaptation to medium-low maintenance and resistance to other diseases and insects.

There is interest in multiple component cultivars that are more widely adapted, have enhanced long term performance and seed yield.

The most exciting developments in the last 20 years have been in turf type perennial ryegrasses. In 1967 Manhattan was released followed by Pennfine in 1970. There have been many improvements in turf type perennial ryegrasses - quick and easy establishment, wide soil adaptation, more attractive, increased density, more persistence and wear tolerance, little thatch, resistance to Fusarium, recovers rapidly in cool weather. It is susceptible to Rhizoctonia and Pythium. Turf type perennial ryegrasses are used for winter over-seeding. New cultivars will surpass those now being used.

There is interest in grasses for poor soil and low inputs.

There are four types of fine fescues - 1] Chewings type 42 chromosomes, 2] slender creeping red 42 chromosomes, 3] strong creeping red 56 chromosomes and 4] hard fescue 42 chromosomes.

There have been improvements in turf type tall fescues but these advances have not been as great as in the perennial ryegrasses. There are many new improved cultivars.

There is consumer interest in reduced mowing requirements. Dwarf species are being tested. There are many attributes that need to be considered in association with dwarfness including the differential effect of daylength, density, spring greenup, stress tolerance, disease and insect resistance and good roots.

Some of the greatest accomplishments have been in the area of disease resistance. Merion Kentucky bluegrass is just as resistant to leaf spot now as it was in the '30s. Others also show resistance to leaf spot. Many newer cultivars are more resistant to stripe smut. Rust is a constant challenge. Hard fescues, more than other types, are more resistant to red thread. Need better resistance in cultivars to dollar spot. There are still challenges in this area.

Endophytic fungi were first discovered in New Zealand. It has been shown that many types of grasses have endophyte and that this gives resistance to certain insects. There are several types of endophytic fungi in grasses. In the south, tests in large fields show grub control by endophyte containing grasses which has not shown up in small plot tests. Cultivars with high endophyte content are being developed and there is more recognition of the complexity of the endophyte/host situation.

New breeding and evaluation techniques have been developed and are being used. There is a wealth of germplasm available. Every step leads to increased understanding of the needs of the turfgrass industry.

TRENDS IN HOME GARDENING

by

Bob Thompson

Host of "The Victory Garden" TV Garden Show
WGBH Public TV
Boston, Massachusetts

Bob Thompson, host of "The Victory Garden" TV garden show, WGBH Public TV, Boston, spoke at the Home Garden Division of ASTA on "Trends in Home Gardening".

- An increasing number of questions come in from the public about "safe" chemicals. There is a real concern about pesticides used by commercial food growers in the US and even more about chemicals used on vegetables and fruits shipped into this country. Grow your own vegetables and fruit and know what you've got.
- There is an increase in interest in bedding plants.
- Acid rain is a concern in many areas. Canada has lost 10,000 lakes due to industrial pollutants carried in rain.
- There are many new improved varieties of garden plants. Often the older varieties are used because the names are familiar.
- There are so many choices of seed, confusion results. Clean up the information flow to consumers with short, precise messages.
- Audiovisual film loops or videotapes in dust-proof, easy to clean viewers in garden centers which give a maximum of information on one subject in 2-3 minutes would help the consumer and be a selling aid.
- Radio is a serious media and excellent for education. Two minute program pieces that are clear and direct are effective.
- Most consumers have relatively little knowledge about gardening. They need more direct, clear information from the industry to encourage participation in gardening.
- Garden stores need to educate all levels of their staff so that questions can be answered correctly.

Note: Although Mr Thompson spoke about vegetable and flower gardens, the above points could also apply to lawngresses.

1987

U.S. Constitution Bicentennial



We the People

of the United States, in order to form a more perfect Union, establish Justice, insure domestic Tranquility, provide for the common defence, promote the general Welfare, and secure the Blessings of Liberty to ourselves and our Posterity, do ordain and establish this Constitution for the United States of America.

TURFGRASS INDUSTRY TRENDS

by

Beverly C Roberts
The Lawn Institute
Pleasant Hill, Tennessee

The Lawn Institute office serves as a source of information on industry trends. Among those of most recent note are the following.

The National Garden Surveys done by the Gallup group for the National Gardening Association show increased interest in lawns each year with lawn tending the # 1 gardening do-it-yourself activity.

Parallel to this is the trend of hiring professionals to take care of lawns. As a result there has been growth of the Lawn Servicing portion of the industry.

One of the most exciting trends has involved the development of proprietary seeded cultivars. This has been prominent in the northern, cool, humid region with many new cultivars coming out of breeding programs in public and private sectors. These cultivars are greatly improved over the common types and have more disease and insect resistance, and require lower maintenance. There are new, improved cultivars in the Kentucky bluegrasses, fine fescues, turf type tall fescues, perennial ryegrasses and bentgrasses. The southern region has not had these seeded proprietary cultivars available. But recently there have been breakthroughs that will give southern gardeners more opportunity to enjoy lawn seeding.

Growth regulator chemicals have been used on agronomic and horticultural crops successfully. Now similar growth regulators are being researched for turfgrasses. In the next 5 years these sprays that might be used twice a year to reduce mowings to once a month should be available for lawns. They will not only slow foliage growth but will stimulate root growth. Some are already being used on roadsides so that mowing is reduced to once or twice a year to clean up weeds.



There is general concern by the public about the constant use of pesticides which has led to an increased interest in "organic" methods. Lawn care is a type of grassland agriculture that stimulates soil microbiological activity when slow release forms of fertilizer are used. Combining this type of care with the new cultivars gives the opportunity to have a nice healthy lawn without harming the soil environment.

The increasing concern about the scarcity of water in some regions has led to more use of organic wetting agents. These wet hard-to-wet soils so that water will penetrate into the soil rather than run off.

Irrigation systems are being improved all the time. New underground units have sensors in the soil that signal a computer telling when to water and how much is needed. Some systems will also time the watering to low rate water use schedules. These save water so that over time the system pays for itself.

Progress is being made in improving sports fields for public schools from elementary through high school. Data on injuries has created interest in this across the country. A well turfed field cushions the young athlete and provides good footing so that many injuries are minimized. The new National Sports Turf Council is a clearinghouse for information on this subject.

Almost every state has specialists in turf education and research at the land grant university. They are available as a source of good information for people in the state.

New equipment has been developed in the last few years that is available as a dethatcher, slicer or power rake. These can be used to thin out a poor lawn and then, with or without the use of glyphosate as a weed killer, the gardener can seed with new cultivars without having to completely tear up the lawn. This has been a boon to home gardeners wanting improved lawns.

These trends indicate clearly that lawn care is keeping pace with high technology of the 1980s.

GETTING LAWNGRASSES AND WOODY ORNAMENTALS TO LIVE TOGETHER

by
Eliot C Roberts

The Lawn Institute
Pleasant Hill, Tennessee

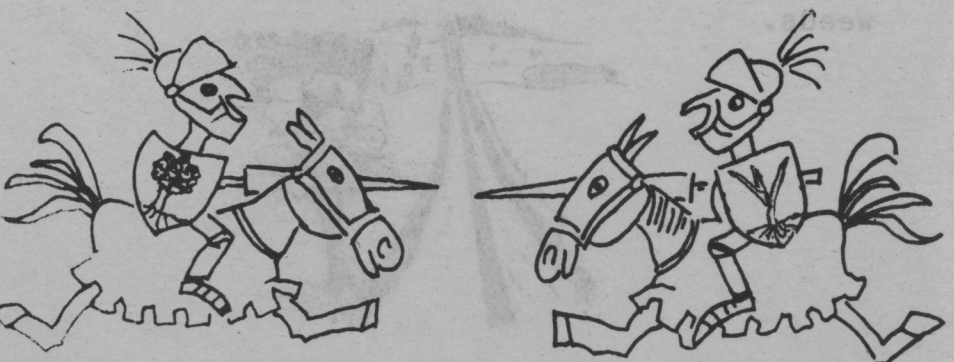
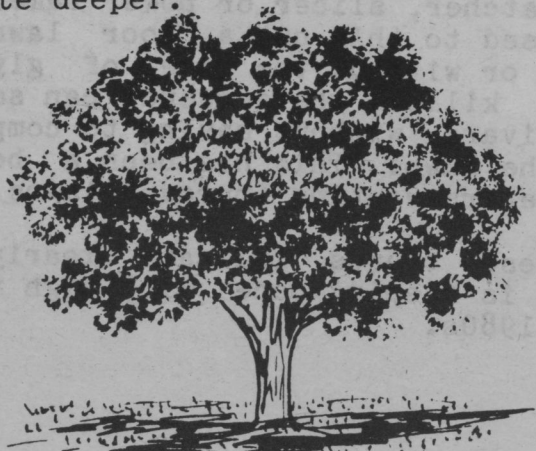
Landscape plants grow in an environment of competition. Foliage of different plants compete for light and roots compete for soil air, moisture and mineral nutrients. As important as light is, the major competitive influences affect root growth down into the soil. These influences result in plant competition that pits lawngrass against lawngrass, lawngrass against a variety of herbaceous weeds, lawngrasses against woody trees and shrubs, and woody plants against woody plants. In addition, the roots of all plants compete with soil macro- and micro-organisms.

In order to appreciate the existence of competitive forces among plant communities, it is necessary to recognize the influence of:

- nutrient availability,
- soil aeration,
- temperature,
- mowing practices,
- watering practices

on root growth and penetration into the soil.

Root growth always takes place in a gradient from a zone of equal or less favorable conditions to a zone of equal or more favorable conditions. Soils with favorable texture and structure to a three inch depth will restrict lawngrass root development within that volume of soil. Where there is six inches of good soil, roots will penetrate deeper.



Nutrient Availability

Lawn fertilization, as a practice, is often confusing and misunderstood. It should not be the plant we fertilize, but the soil. When plants are grown in solution culture, or in sand, or other artificial media, which have no innate fertility, it is indeed the plant that is fertilized. When ornamentals are grown in soil, it is the soil that is fertilized; plants get their nutrients from a dynamic [living] soil system.

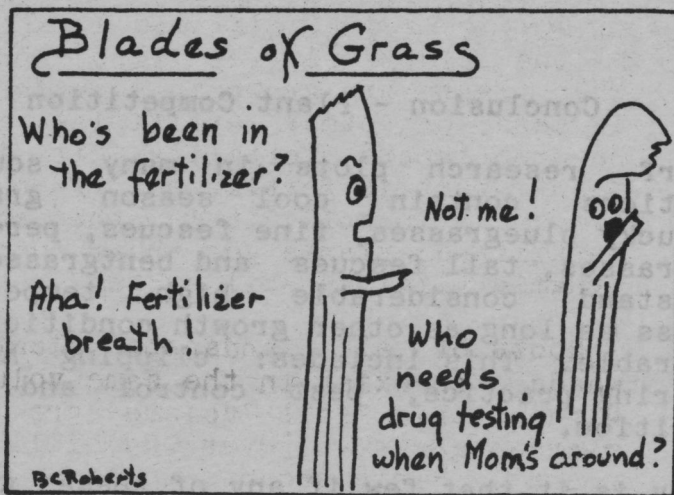
Roots of all landscape plants, including weeds, co-exist in the same volume of soil. Within this soil volume are billions of micro-organisms [over 900 billion for every pound]. This amounts to about 70 pounds of bacteria, fungi, protozoa, actinomyces and others for each 1,000 square feet of lawn. These organisms live in about 50,000 pounds of soil for each 1,000 square feet of lawn. Competition for mineral nutrients, soil oxygen and moisture is keen. Also, part of this vital living soil complex involves thousands of insects and other small animals, like earthworms.

All these organisms are active in the decomposition of soil organic matter and in the formation of humus. They utilize organic carbon, as a source of energy, and mineral nutrients in this process. They compete with each other for these resources and also compete with plant roots which require soil oxygen, moisture and mineral nutrients for growth and development. Competition for nitrogen is especially strong.

CONTINUED

Location of nutrients is important in determining where roots will grow. Surface fertilization of lawns places a higher concentration of nutrients at the soil surface than down within the soil. Under these conditions, tree roots will grow toward the surface where competition with lawngrasses is great. Tree roots usually have an advantage, particularly where lawngrasses are weakened by low light intensity [shade].

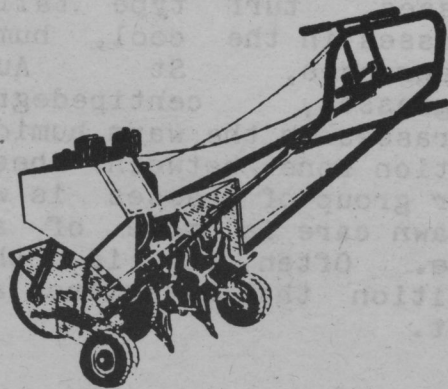
Fertilization of trees and shrubs by placement of nutrients in holes six to twelve inches deep encourages deeper penetration of tree roots and less competition with lawngrass roots above.



Soil Aeration

When soils become compacted, the size of the pore spaces become smaller and exchange of carbon dioxide polluted air for fresh air is restricted. As oxygen levels become less, deeper within the soil profile, root growth is also lessened. In these instances, roots stay near the soil surface.

Mechanical aerification of the soil by removal of cores helps get both fresh air and water down deeper to make conditions more favorable for root growth.



Temperature

Lawngrasses respond directly to temperatures, both atmospheric and soil. These influence growth of roots and foliage.

For example, a favorable temperature range for growth of foliage on cool season [northern] grasses would be 60 - 75 degrees F. For warm season [southern] grasses, this would be 80 - 95 degrees F. When temperatures are in excess of 75 degrees F., particularly at night, northern grasses suffer. They can withstand daytime temperatures in the 80s and low 90s but suffer some heat stress. When temperatures drop from 80 degrees F. down to about 50 degrees F., southern grasses lose vigor. At about 50 degrees F., growth is stopped completely and these grasses start to go dormant.

Root temperature responses are equally striking. Northern grasses like soil temperatures from 50 to 65 degrees F. for best growth and development, while southern grasses develop best roots when soil temperatures range from 75 to 85 degrees F. Soil temperatures much above 65 degrees F. cause northern grasses to fail to produce new roots. When soil temperatures are in the 70s and low 80s, root decomposition weakens the turf significantly. With southern grasses, soil temperatures below 75 degrees F. are detrimental and when soil temperatures drop to the low 60s and 50s, root growth and function is not adequate to prevent dormancy.

We recognize that photosynthesis, the manufacture of energy yielding food substances - carbohydrates, takes place only in the presence of light. These substances are being utilized through respiration processes all the time, even when it's dark. High night time temperatures rapidly deplete food reserves. This weakens the cool season lawngrasses more than warm season grasses that can tolerate higher temperatures.

We also recognize that cool temperatures interfere with the growth and development of warm season grasses so that they are weakened at times when cool season grasses grow best. Because of these temperature relationships, the common practice of using both warm and cool season grasses to provide year round turf is recommended in the south. This involves seeding cool season "winter grasses" when the warm season grasses can no longer grow well. These act as an annual planting and are replaced by the resurgence of warm season grass growth in late spring.

CONTINUED

Mowing Practices

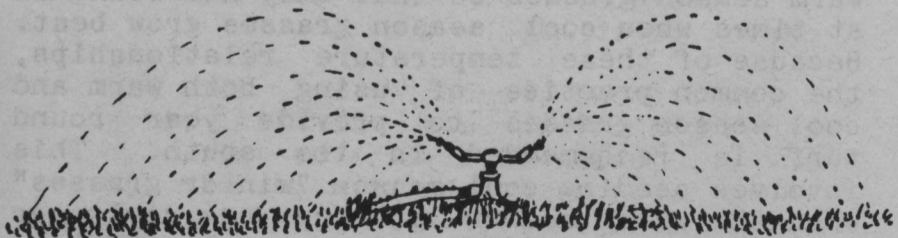
Lawn mowing has a harmful effect on the growth and development of grass roots. Mowing is necessary in the maintenance of a lawn. It causes a turf to form that has a desirable density. It makes grasses sod forming. But, there are limits to how close a lawn should be clipped. The lower the clipping height, the greater the restriction in root development. Most northern lawns should be cut at from 1 1/2 to 2 inch heights. Southern lawns containing bermudagrass are best cut a little shorter - 3/4 to 1 inch.

Mowing reduces the leaf surface of lawngrasses. Sufficient leaf surface is needed to manufacture food to sustain the plant. A combination of leaf blade width, clipping height and the numbers of vegetative buds per square inch of lawn determine the amount of leaf tissue available to manufacture food substances for lawngrasses. For the average lawn, either north or south, an increase in the height of cut of only 1/8 inch will increase leaf surface 300 square feet for each 1,000 square feet of lawn. That would amount to the equivalent of one new gigantic leaf 50 feet long and 6 feet high added to each 50 foot by 20 foot segment of lawn. This amount of additional leaf surface will help lawns to survive stress and competition with other landscape plants.

Remember, that no other ornamental plant is so severely defoliated as is turfgrass and still expected to live. Hedges are trimmed to maintain size and shape, but this is mild treatment compared to lawngrasses and sports turf.

Watering Practices

When trees and lawngrasses have roots together in the same soil volume, watering the surface makes that area more favorable, so roots grow in that direction. Deep watering helps encourage deep root penetration.



First, water must be able to penetrate through thatch and down into the soil surface. Wetting agents or surfactants help to get water started. Then, the soil must be sufficiently porous to have infiltration continue down through the root zone and even into the upper subsoil. The maintenance of a water reservoir at these deeper soil depths will enable the upward movement of water by capillary action as surface layers dry out some. This process maintains a moisture gradient that favors deeper root penetration for all competing plants.

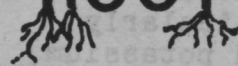
Conclusion - Plant Competition

Turf research plots in many southern locations contain cool season grasses. Kentucky bluegrasses, fine fescues, perennial ryegrasses, tall fescues and bentgrasses can withstand considerable high temperature stress as long as other growth conditions are favorable. This includes: clipping height, watering practice, pest control and proper nutrition.

Why is it that few if any of these grasses are used in home lawns in these southern locations? Research plots are located in open spaces where there are no competing tree or shrub roots. In the residential landscape, there is much competition of this type and cool season lawngrasses are weakened just enough to be less persistent under high temperature stress.

The weakening effect of competition between plants, particularly lawngrasses, is much more damaging than we might expect. A nice lawn in the absence of other landscape plants does not generally fit in well with modern architectural concepts. Thus, selection of lawngrasses that can compete well in the total landscape is of utmost importance. In general, this involves use of Kentucky bluegrasses, fine fescues, perennial ryegrasses, turf type tall fescues and bentgrasses in the cool, humid north, and bermudagrasses, St Augustinegrasses, zoysiagrasses, centipedegrasses, and bahiagrasses in the warm humid south. In the transition zone between these two regions, neither group of grasses is well adapted and thus lawn care is more of an art than a science. Often it is the degree of competition that determines survival of the fittest.

GETTING TO THE ROOT



OF LAWN GRASS MAINTENANCE PROBLEMS

by

Eliot C Roberts

The Lawn Institute
Pleasant Hill, Tennessee

The roots of lawn grass plants are their key to persistence and even survival. Many environmental conditions and maintenance practices affect root growth and development.

The following outline presents a functional review of topics that must be kept in mind in order to grow healthy roots and thus prevent lawn failure.

I. Importance of the Root System in Maintaining a Healthy Vigorous Turf

A. Functions of turfgrass roots

1. Keep plant in position
2. Storage of excess foods [organic]
3. Absorption of water
4. Uptake of plant food elements [inorganic]

B. Causes of poor root penetration

1. Soil factors
 - a. Compaction [lack oxygen]
 - b. Water [too much or too little]
 - c. Fertilizer [too much or too little]
 - d. Temperature [too hot or too cold]
2. Cultural factors
 - a. Reduction of carbohydrate food reserves through disease or insect injury to leaves or through loss of foliage by clipping.
 - b. Fertilization that is off balance will cause a poor carbon-nitrogen ratio within the plant.

C. Important to remember

1. Only a small portion of the root functions in absorption of water and minerals; so need largest root system possible.
2. About 1/2 of the root system of turfgrasses is renewed each spring; so need conditions in the spring that are favorable for root growth.
3. Persistence of turf is indicated by the ratio of top growth to root growth. This ratio should be wide indicating either an extensive root system or slow top growth.



11. Effects of Clipping and Fertilization on Root Growth of Lawngrasses.

A. Basic facts to consider:

1. Nitrogen, phosphorus, potassium, sulfur, calcium, magnesium, iron, boron, manganese, molybdenum, copper and zinc are inorganic fertilizer elements required by turfgrasses for healthy vigorous growth. These can be purchased in commercial forms and applied as needed to stimulate growth.
2. Organic foods [carbohydrates, fats and proteins] are also essential for the production of a vigorous turf. These foods cannot be purchased in commercial forms to be applied to the grass. They must be manufactured within the plant and stored within the plant in sufficient quantities to meet the needs of the turf in producing new foliage and deeper root systems.

3. Only when both the essential inorganic elements [particularly nitrogen, phosphorus and potassium] and the organic foods [particularly carbohydrates] are present within the grass in adequate amounts is it possible for the plant to develop sufficient new leaves and roots to maintain a fine turf. Either one present without the other results in a weakened turf - slow to heal from injury and with a poor, shallow root system.
4. Nitrogen plus adequate carbohydrate within the plant stimulates top growth.
5. Phosphorus plus adequate carbohydrate within the plant stimulates root growth.
6. Potassium in the presence of adequate nitrogen, phosphorus and carbohydrate within the plant stimulates the efficient utilization of all three.
7. The amounts of nitrogen, phosphorus and potassium within the plant may be varied by the fertilizer ratio and practice used.
8. The amounts of carbohydrates within the plant may be varied by any or all maintenance practices; i.e., clipping, watering, aerification, fertilization, etc.

Clipping

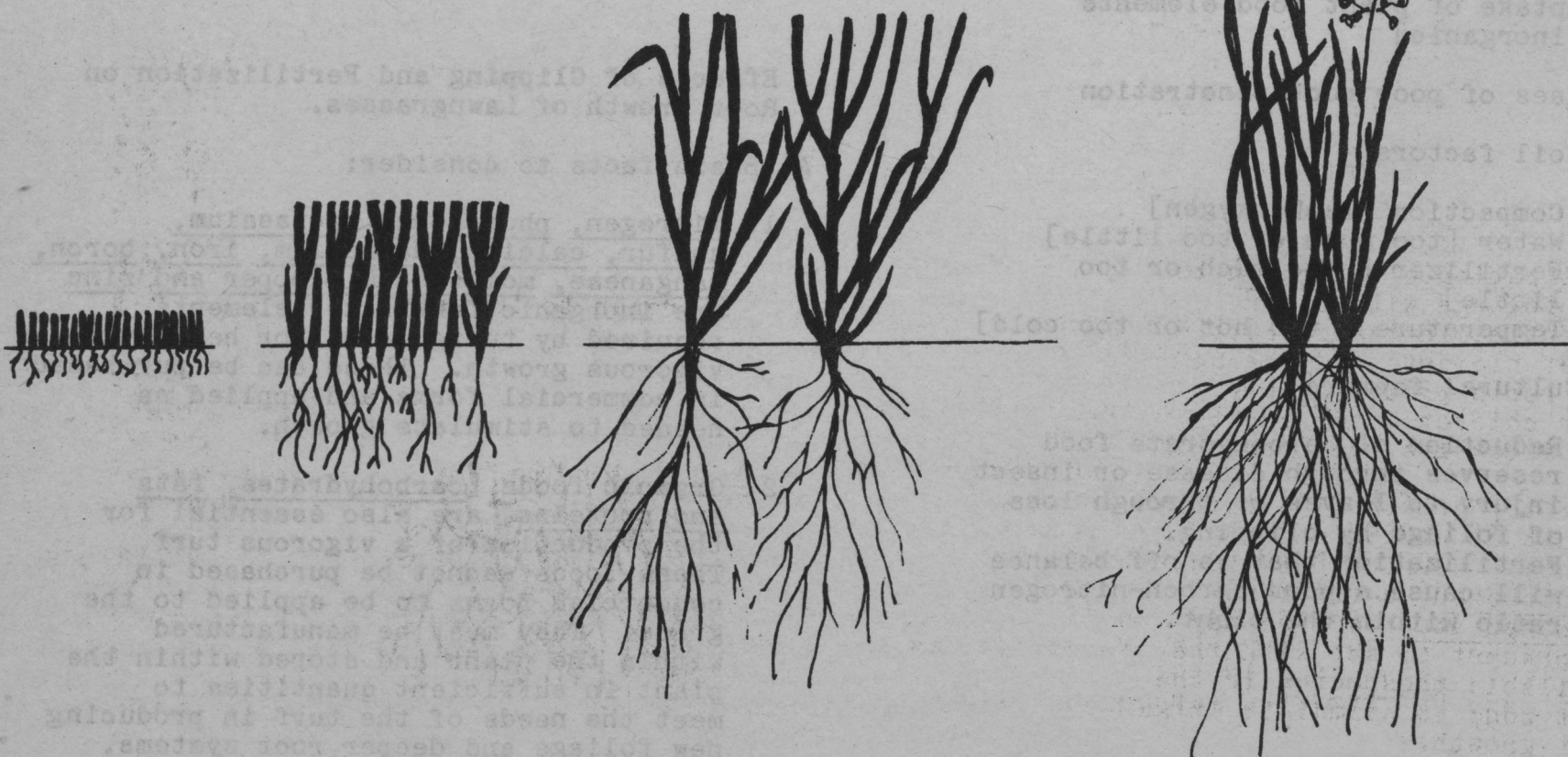
1. Clipping any turfgrass reduces the leaf surface exposed to the light. This reduces photosynthesis which results in a low production of carbohydrates. This reduces root growth and total spread of top growth even though adequate inorganic fertilizer elements may be present.
 - a. Clipping is a necessary evil in all turf maintenance operations.
 - b. Because of this unavoidable harmful effect on the grass plant, every effort should be made to make all other conditions for plant growth as favorable as possible. This includes adequate watering, fertilization and aerification practices.

1/4 " cut

3/4 " cut

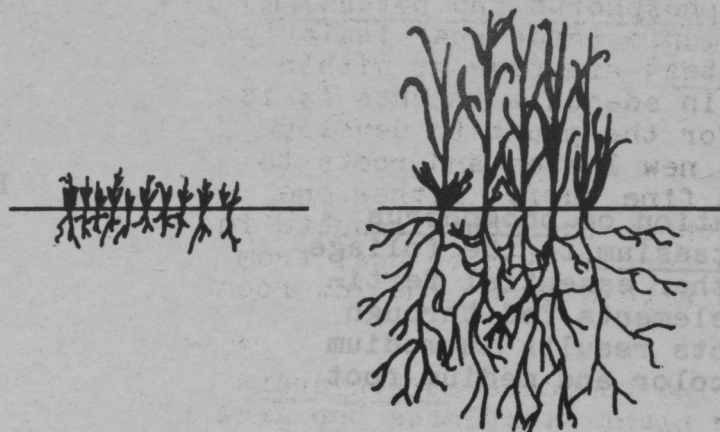
1 1/2 " cut

uncut



Fertilization

1. Lack of adequate fertilizer elements in the root zone decreases both root growth and top growth of turf-grasses.



Inadequate root feeding

Adequate root feeding

2. Substitution of root feeding by foliar feeding is not effective in meeting the needs of the plant for inorganic fertilizer elements.

Foliar feeding



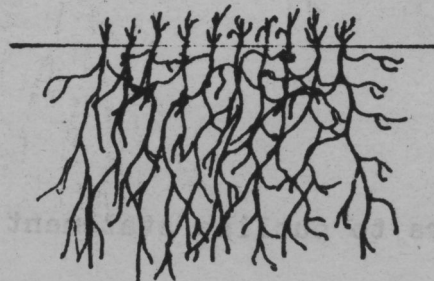
No root feeding

3. These decreases [1 and 2]* in root and top growth are due to both low levels of inorganic elements and low levels of carbohydrates within the plant.

4. Application of nitrogen to the foliage with other essential inorganic fertilizer elements fed through the roots produces very poor chlorotic top growth but excessive root growth.

Nitrogen to foliage

5. Poor top growth [4]* is the result of nitrogen deficiency. Despite this lack of nitrogen, sufficient carbohydrate reserves may be present to act with the available phosphorus in the root zone to stimulate large root growth.

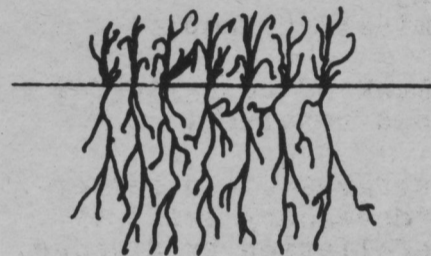


All other elements to roots

6. Application of phosphorus and potassium to the foliage with other essential fertilizer elements fed through the roots results in medium green color and medium root growth.

Phosphorus and potassium to foliage

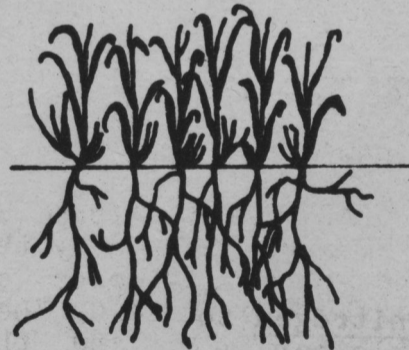
7. Sufficient phosphorus and potassium may be supplied from the leaves to the roots to act with the available carbohydrates to stimulate a medium growth of roots. [6]* Ample nitrogen may be available to act with the carbohydrates to stimulate a medium growth of leaves. The dark blue-green color of the foliage is often a sign of phosphorus deficiency.



All other elements to roots

8. Minor elements fed through the leaves are adequate to meet plant needs.

Minor elements to leaves



All other elements to roots

* [Number refers to outline statement above.]

III. Summary

A. When grass roots are too close to the soil surface, turf may be injured because of:

1. Too much water [example - winter injury]
2. Too little water [example - wilt or desiccation]
3. Damage by chemicals [example - pesticide]
4. Starvation - lack of both mineral and organic food reserves.

B. To encourage turfgrasses to better withstand the "necessary evil" of clipping, or defoliation by disease or insect injury:



1. Maintain turf at the highest height of cut consistent with use specifications for the turf.
 - a. An increase in the height of 1/16 inch makes a difference - 150 square feet more leaf surface for each 1000 square feet of lawn surface. This is the equivalent to one new leaf 50 feet high by 3 feet wide on each lawn area measuring 50 feet by 20 feet.
2. Fertilize to encourage root growth as well as top growth.
 - a. Slowly available nitrogen is superior to larger applications of readily available nitrogen.
 - b. Use adequate phosphorus and potassium.
 - c. Root feed rather than foliar feed except where it may be necessary to apply minor elements.
3. Water with the objective of wetting the soil to a depth below the root zone.
4. Cultivate the soil to keep it from becoming excessively compacted.



A BLADE OF GRASS

E W Hamilton

I AM A BLADE OF GRASS - the Alpha of visible organics. I was ordained by the CREATOR to be the first evidence of organic life on earth when HE said, "Let the earth bring forth grass- and the earth brought forth grass- and the evening and the morning were the third day"

I preceded man by millions of years as he was not created until the sixth day.

Through eons of time, I absorbed and assimilated the inorganic elements of land, sea and atmosphere, building them into living cells; evolving new forms, kinds and species; zealously guarding the GOD-given power to retain and reproduce that mysterious thing called life against such time as man should require it for his physical existence.

I am an indispensable source of all life on earth, regardless of genus, which may account for my being placed before man and the animals in GOD'S PLAN OF CREATION.

I belong to a family so numerous and varied as to almost defy description.

I am utilitarian to a degree which is limited only by man's ability to adapt me to his needs and desires.

I serve the aesthetic as well as the practical, for all the creatures we behold are but the hues of the field, digested into flesh in them, or more remotely carnified in man himself - I AM A BLADE OF GRASS.

Lawngrasses Recognized For



The Lawn Institute's Variety Review Board announced the 1987-1988 list of recognized cultivars at its Annual Meetings in Boston, Massachusetts on June 30, 1987.

"Fall is For Planting" is a theme used throughout the country in recognition of the advantages this season offers gardeners. New lawns and renovated old lawns can be seeded with the newer cultivars at this time of year with excellent results expected.

The Lawn Institute recognized cultivars have been chosen for their vigor and are more insect and disease resistant. Their development has involved many years of research and breeding. They are the best available.

The following cultivars made the Variety Review Board recognized list for 1987-1988:

Kentucky Bluegrasses:

- A-34 Bensun
- Wareen's Turf Prof
- Adelphi
- J & L Adikes
- America
- Pickseed West Inc
- Arboretum
- Mangelsdorf Seed Co
- Baron
- Loft's Inc
- Classic
- Peterson Seed Company
- Eclipse
- Turf Cultivars Asso
- Fylking
- Jacklin Seed Company
- Glade
- Jacklin Seed Company

- Gnome
- Turf Merchants Inc
- 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
- Sydsport
- E F Burlingham & Sons
- Touchdown
- Pickseed West Inc

Turf Type Perennial Ryegrasses:

- All*Star
- J & L Adikes
- Delray
- Northrup King & Co
- Derby
- International Seeds Inc
- Elka
- International Seeds Inc
- Fiesta
- Pickseed West Inc
- Manhattan II
- Turf Merchants Inc
- Pennant
- E F Burlingham & Sons
- Pennfine
- Seed Prod & Intro Corp
- Ranger
- Van Der Have of OR
- Regal
- International Seed Company
- Repell
- Loft's Inc

More Excellent Lawngrasses



Fine Fescues:

- Banner - Chewings type -
E F Burlingham & Sons
- Ensylva - creeping type -
International Seeds, Inc
- Koket - Chewings type -
E F Burlingham & Sons
- Reliant - hard fescue -
Loft's Inc
- Jamestown - Chewings type -
Loft's Inc

Turf Type Tall Fescues:

- Arid - Jacklin Seed Company
- 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 -
Seed Research of OR, Inc

Specialty Grasses:

- Fulfs Alkaligrass -
Northrup King & Co
- Sabre - Poa trivialis -
International Seeds, Inc
- Reubens - Canada bluegrass -
Jacklin Seed Company

Several grasses of the same species are usually selected because not all may be equally available in every part of the country. Any one of them are a sure bet. For more information on these cultivars and where they might be obtained in your area, contact the sponsoring firm.

- J & L Adikes, Inc: 182-12 93rd Ave
Jamaica NY 11423 [718/739-4400]
- E F Burlingham & Sons, Inc: P O Box 217
Forest Grove OR 97116 [503/357-2141]
- Full Circle Inc: P O Box 49,
Madras OR 97741 [503/475-3877]
- International Seeds, Inc: P O Box 168
Halsey OR 97348 [503/369-2251]
- Jacklin Seed Company: West 5300 Jacklin Ave
Post Falls ID 83854 [208/773-7581]
- Loft's Inc: P O Box 146
Bound Brook NJ 08805 [201/560-1590]
- Mangelsdorf Seed Company: P O Box 327
St Louis MO 63166 [314/535-6700]
- Northrup King & Co: p o box 959
Minneapolis MN 55440 [612/781-5345]
- Peterson Seed Company: P O Box 346
Savage MN 55378 [612/445-2606]
- Pickseed West, Inc: P O Box 888
Tangent OR 97389 [503/926-8886]
- Seed Research of OR Inc: 644 SW 13th St
Corvallis OR 97333 [503/757-7933]
- Seed Production & Introduction Corp:
P O Box 923, Minneapolis MN 55440
[612/781-8011]
- Turf Cultivars Associates Growers:
W 5300 Jacklin Ave, Post Falls ID
83854 [208/773-7581]
- Turf Merchants Inc: P O Box 1467
Albany OR 97321 [503/491-3622]
- Van Der Have of OR: P O Box 1496
Albany OR 97321 [503/967-8923]
- Warren's Turf Nursery Inc: Box 459
Suisun City CA 94585 [707/422-5100]

TURFGRASSES for the SOUTH

During the past year, several topics have been featured at turf conferences to draw attention to southern turfgrass varieties. Just a year ago [July 1986] at the Mississippi and Southern Turfgrass Conference in Biloxi, Ray Dickens, Wallace Menn and Jeff Krans of Auburn, Texas A & M and Mississippi State Universities, respectively, discussed "New Turfgrasses for the South". They identified St Augustinegrass, zoysiagrass, centipedegrass, buffalograss, bermudagrass, tall fescue and bentgrass as having interesting possibilities for improvement. Later, [December 1986], at the Texas Turfgrass Association Conference in San Antonio, Milt Engelke of Texas A & M University considered the topic "Turfgrasses on the Horizon" in some detail.

The following review of these topics charts progress in current research and identifies realistic expectations for cultivar improvement.

Turf and Lawngrass Utility

- Dr Engelke lists four types of turf uses: soil conservation and stabilization, climate control, aesthetic values, recreation.
- Within these uses are specialty turf areas where traffic is high, wear is severe, soil compaction is likely and management is intense. These areas require special turfgrasses.
- Further, in the south, seasonal patterns of performance must be considered. For example, bermudagrasses can be expected to provide good cover for only 185 to 190 days compared with 320 days for tall fescues. The key question asked is how can new grasses or new management techniques prolong the utilization of turf through the south where it's good to be out-of-doors nearly year round?



Bermudagrass

- According to Dr Engelke cold tolerance is a major limitation in the use of bermudagrasses throughout the upper south. Tifdwarf and Tifgreen look good in Texas. Midiron, Santa Ana, Tifway and Texturf 10 are also good. He noted that Ormond and Midiron bermudagrasses seem more resistant to the mole cricket.
- Dr Krans has 40 turf type bermudagrasses under evaluation at 7 locations. These are vegetatively propagated so that uniformity of starts can be realized. Variability within these grasses is pronounced.

Zoysiagrass

- Dr Engelke has a major interest in zoysiagrasses. In Japan, Zoysia matrella is used on golf putting greens.
- Zoysia plugs are slow to establish. Continuing research on vegetative propagation is helping to speed this process.
- The golden color of dormant zoysia in the winter gives it a unique appearance that is superior to other grasses. In addition to common Korean zoysia, which is seeded, there are vegetatively propagated types including: Meyer, Emerald, Midwest, El Toro, Belair.
- Sufficient genetic variation has been identified to make improved, seeded zoysiagrasses a good prospect for the future. [7-8 years to release a seeded cultivar.] At Texas A & M University, zoysiagrass breeding is now into its fourth year. The following results have been of interest: good cold tolerance; good wear tolerance; good water use rate [slow]; potential for salinity tolerance; potential for adaptability to a variable climate [longer growing season]; potential for development of short tillers that use even less moisture; potential for types that can be hydro-sprigged; potential for reduction of cultural inputs [fertilization].

ST Augustinegrass

- Dr Engelke rates St Augustinegrasses as the most shade tolerant of the warm season grasses. Texas common, Raleigh, Seville and Floratam look good. Improvement is needed in resistance to the SAD virus and to Downy mildew. More cold tolerance and more dwarf types are being researched.

Centipedegrass

- According to Dr Engelke, centipedegrasses are not well adopted to alkaline soils. Future improvements are likely to be superior to the following varieties now in use: Georgia common, Oaklawn, Tennessee hardy.
- Dr Dickens has conducted research leading to the development of Centennial and AC-44 cultivars. Both look good for sod production and should be available soon.

Buffalograss

- Dr Engelke speculates that buffalograsses may be the low maintenance turf of the future. At present, in addition to common buffalograss, Texoka, Sharps improved and Commanche are in use. Research on finding types with better turf characteristics is promising. One half inch clipping height tolerance and more rapid growth rates would make buffalograss better for both lawns and golf course fairways. With ever increasing demands on water, buffalograss seeded with blue grama is recommended.

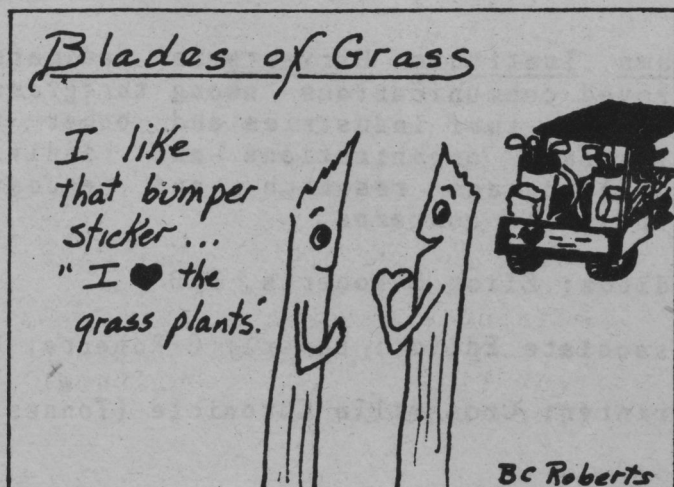


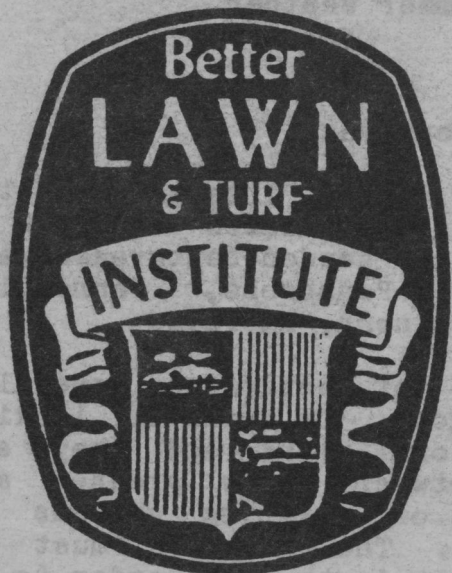
Tall Fescue

- Dr Engelke reports that tall fescues use more water than St Augustinegrass and zoysiagrass. This limits their use in more arid regions of the south. Even so, the tall fescues are being used further south all the time. He recommends the following: Arid [in shade], Apache [in shade], Chesapeake [without irrigation], Adventure, Falcon, Jaguar, Mustang, Olympic, Rebel. More blends of turf type tall fescues are being evaluated and will be promoted.
- The shade tolerance of the turf type tall fescues is an asset in helping them survive hot summer weather.

Bentgrass

- Dr Krans has major interest in the improvement of bentgrasses for use in the south. Five seeded bentgrasses are available now: Penncross, Penneagle, Pennlinks, Prominent, Emerald.
- Research plots of bentgrasses generally do not look good. Dr Krans is looking for an exceptional plant and they are few and far between. New grasses are set into plots of existing grasses by use of plugs. The new types must be better than what is there in order to be worth further evaluation.
- Finally, determinations must be made to see if the new, better characteristics can be transmitted to a new generation by seed.





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