

Turf Training III, 6

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# WEEDS TREES and TURF

A TRADE MAGAZINES PUBLICATION

June 1967



**Successful  
Arborists  
Are  
Good Managers  
Page 19**



**Watering  
And  
Clipping Height  
Page 10**

Ben Houlihan, left, of Houlihan Nursery Company of Creve Coeur, Mo., discusses nursery stock inventory with F. Lewis Dinsmore. The Houlihans draw on 200 acres of company plantings to supply their sales outlet. Like other arborists, Dinsmore buys specific trees when he cannot supply a customer's needs from his own tree nursery. (See page 19).

Monthly magazine of methods, chemicals and  
equipment for vegetation maintenance and control



Daconil 2787 being applied on greens at Kirtland Country Club, Kirtland, Ohio

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goodbye  
to weeds  
and disease  
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# WEEDS TREES and TURF

FORMERLY WEEDS AND TURF

June 1967  
Volume 6, No. 6

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## Encourage Your Men to Grow

Gone are the days when a pat on the back and a turkey at Christmas will guarantee company loyalty and help you hold your employes.

Complimenting a man is old hat. You'll do a better job of reaching him and developing a sense of belonging if you assure him of his value to the organization. Consider your men who are at the foreman level. You expect them to be more knowledgeable about the business than they needed to be 25 years ago.

Nor is money the critical element in keeping men that it once was. Not that you can get by without paying good wages; you can't. There are too many good jobs for the capable man.

Employers agree that morale, especially at the foreman level, is vitally important. Some work at attaining it, others expend little effort in this direction, though morale doesn't happen because you are considered a fair employer who "pays pretty well."

We believe the most effective method of instilling loyalty and building a staff of longtime, steady foremen is by encouraging individual growth. Such growth can come in many ways besides experience on the job, valuable as this is.

Consider the value of sending one or more of your foremen to a short course in the field each year. Cost will be negligible, considering the experience gained through association with others in the field and in a firsthand study of technical material. Consider training courses sponsored by companies who supply your equipment or materials. Many have off-season training sessions offering specialized schooling. Encourage correspondence school training if available. Make a practice to send one or more foremen to state, regional or national meetings of the industry. Set up your own company-sponsored training sessions and call in guest specialists to handle them. Cost again will be negligible considering the value to your men. Finally, see that all foremen, and perhaps others, get the technical publications which fit your field. Having these at the office seldom benefits your foremen. They can't read on the job. See that they get the magazines at home.

When you hire a new employe, use your knowledge of men and mentally project how far he will be able to go in your organization. When you have a choice, pick the man with an open mind, capable of developing mature judgment. He's the type who will benefit from your program.

In short, develop company pride by encouraging individual growth. The payoff will be loyalty and better service to you and to your customers.

WEEDS TREES AND TURF is the national monthly magazine of urban/industrial vegetation maintenance, including turf management, weed and brush control, and tree care. Readers include "contract applicators," arborists, nurserymen, and supervisory personnel with highway departments, railways, utilities, golf courses, and similar areas where vegetation must be enhanced or controlled. While the editors welcome contributions by qualified freelance writers, unsolicited manuscripts, unaccompanied by stamped, self-addressed envelopes, cannot be returned.



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## Survey '67:

# Turfgrass Management Training, Part 3

*From "brushup" short courses to two-year technical programs, from four-year undergraduate courses leading to B.S. degrees to research-oriented postgraduate studies, colleges around the country are stepping up their turfgrass management training programs in the face of heavy demand for graduates. On the following pages, and in coming issues, WTT surveys turfgrass programs and the specialists behind them. Final installment will appear in July.*

### Lake City Junior College, Lake City, Florida



**Dr. James H. Thacker:** Career opportunities are almost unlimited because of the rapid growth of the industry and the accompanying advance in technological developments.

Turfgrass and ornamental horticulture management programs have been developed through cooperation of colleges and industry representatives. A 2-year course is offered through the Technical Division of the College. Graduates are awarded an Associate of Science Degree in either Turfgrass Management or in Ornamental Horticulture.

Dr. James H. Thacker directs both the turfgrass and ornamental horticultural programs. Subjects of the turfgrass program center around establishment and maintenance of industrial and municipal parks, golf courses, cemeteries, road rights-of-way, and public and commercial building grounds. Specific subjects are turf growth and composition, insects and diseases, fertilization, and turf protection. Theory and technical knowledge are given in the classroom and actual performance of skills in the industry are carried out in both indoor and outdoor laboratories.

Enrollment for the program which was started last year consists of 9 day students with an additional 24 students taking night classes.

Requirement for admission is a high school education. Classes begin August 14 which is also the deadline for application. Tuition costs average about \$75 per term for local students, \$90 for other Florida students, and \$125 for out-of-state students. On-the-job training is a program requirement. The course is the only one of its type in the Southeast and was designed by industry and college personnel to meet the needs of industry for turf personnel according to Walter D. Anderson, executive secretary of the Florida Turfgrass Association.

Requests for information may be directed to Dr. James H. Thacker, Lake City Junior College, Lake City, Fla. 32055.

### State University Agricultural and Technical College, Farmingdale, New York



**Dr. Donald W. Griffiths, Jr.:** Educators and industry leaders agree that there is a need for competent turfgrass specialists. They can satisfy this need only if they have young men aware of the situation.

Turf training at New York's State University Agricultural and Technical College, Farmingdale, is conducted by the Department of Ornamental Horticulture and is directed by Donald W. Griffiths, Jr., Associate Professor of Ornamental Horticulture.

Program offered is a two-year course leading to an Associate in Applied Science degree in ornamental horticulture with a major in turf management. A separate one-year vocational program is being planned for the near future. Two-year students study turfgrass culture and management, as well as design, horticulture, and arboriculture. Technical courses are supplemented with general education and basic science subjects. Students are required to gain on-the-job experience between the second and third semesters, and additional part-time work is recommended but not required.

Begun in 1966, the Farmingdale program has a first-year enrollment of 10, with a larger class expected for the second year. Courses in turf management and landscape development are taught by Griffiths, with many staff members cooperating in teaching allied subjects.

Requirement for admission to the program is high school graduation with a satisfactory record including math and science studies. Tuition for New York residents is \$400 per year; for nonresidents, \$600. Registration begins Sept. 11, 1967, and Sept. 9, 1968. Applications should be made at least six months in advance, though late applications may be accepted on the basis of student quotas, etc. For further details, write Director of Admissions, State University Agricultural and Technical College, Farmingdale, New York 11735.



## Mississippi State University, State College, Mississippi



**Dr. Coleman Y. Ward:** At no time has there been greater demand for qualified graduates—the need far exceeds present or anticipated enrollment. I know of no area where there is greater opportunity.

Turf training is directed by the Agronomy Department and all turf courses are taught by the staff of the Agronomy Department. However, a joint major is offered by the Departments of Agronomy and Horticulture.

Dr. C. Y. Ward directs the turf research and teaching program. A turf management option offering a B.S. degree is offered by both the Agronomy and Horticultural departments. Emphasis on courses is split about equally between these two departments. Students may also take a Master's or Ph.D. degree in Agronomy Crops with the research program being in the field of turf management. Specific degrees offered for the undergraduate are Agronomy-Turf Management or Horticulture-Turf Management.

Teaching staff consists of Dr. Ward, Dr. Leyton Davis, and Jack E. Gary. The program, started in 1965, has 10 students enrolled with the selected option of Turf Management either in Horticulture or Agronomy. Three students are currently completing B.S. requirements and one is

graduating with a Master's degree. Some 3 to 5 students are expected to graduate annually over the next five years. Work in the field is encouraged. Working agreements with golf course superintendents exist for summer employment. Also, students may alternate school work with outside employment by attending classes during alternate semesters.

Tuition at the University is \$174 per semester which includes student activities and health service. The fall semester begins September 14. A slightly lower rate exists for the spring semester which begins February 2, 1968. An additional \$25 per semester is charged out-of-state students. Students who have completed work at an accredited high school or who transfer from a junior college are eligible. All are required to have taken the American College Test.

Requests for additional information may be directed to Dr. C. Y. Ward, Agronomy Crops, P.O. Box 5248, State College, Miss. 39762.

## The University of Tennessee, Knoxville, Tennessee



**Dr. L. M. Callahan:** Graduates are in great demand for University research and Extension work and by industry in all areas.

Turf Training at the University of Tennessee is offered in the Department of Agronomy, and is directed by Dr. L. M. Callahan, Assistant Professor in Turfgrass Management.

Program offers graduate specialization in turf management at the M.S. and Ph.D. levels, with assistantships available for qualified students. A specialty course in turf management is offered at the senior (undergraduate) level, but also developed for juniors and graduate students. Subject areas covered include all aspects of turf management, such as soil fertility, fertilizers, soil chemistry, genetics, plant physiology, botany, plant pathology, entomology, landscape design, agricultural engineering, etc. Practical training is in-

cluded in this course, and on-the-job training is part of the graduate program.

Begun in 1964, Tennessee's graduate program is just getting underway, with the first graduate student currently completing his M.S. degree in turf management.

Requirement for entering the graduate turf program is established by the University. There is no tuition for Tennessee residents; nonresident tuition for course enrollment is \$150 per quarter. Requests for information regarding enrollment in the University should be addressed to the Dean of Admissions, University of Tennessee, Knoxville, Tenn. Inquiries on the turf management program can be sent to Dr. L. M. Callahan, Department of Agronomy, College of Agriculture, University of Tennessee, Knoxville.

## Washington State University, Pullman, Washington



**Dr. Roy L. Goss:** Opportunities in the field are very good. We have a shortage of good trained personnel.

Turf training at Washington State University is the responsibility of the Agronomy Department, and is a cooperative effort among agronomy staff members.

Program offered is a four-year undergraduate course of study, leading to a B.S. in agronomy with a major in turf. In addition to general science, agronomy, and other required courses, students take the course in Turfgrass Culture, taught by Alvin G. Law. On-the-job training is not included as a requirement of the undergraduate program; however, it is encouraged.

Begun about 1948 in turf research, Washington State's program began offering training courses in 1953. There is still considerable emphasis on research, with Dr. Roy L. Goss and Dr. C. J. Gould de-

voting time to research in turf and turf diseases, respectively. Teaching is done at Pullman with most of the research being conducted at the Western Washington Research Station at Puyallup, Wash.

Requirement for entering the program is admission to the University. Tuition is \$105 per year for residents, and \$315 per year for nonresidents. In the fall of 1967, registration begins Sept. 25, and classes, Sept. 28. In the spring of 1968, registration will begin Feb. 8, and classes, Feb. 12. Early application is advised. Requests for information regarding degrees in turfgrass management (agronomy with turf major) should be directed to Mr. Alvin G. Law, Johnson Hall, Washington State University, Pullman, Wash.



# Trained Graduates Can Cut Operating Costs



Dr. Madison

By JOHN H. MADISON

Associate Professor  
Landscape Horticulture  
University of California, Davis

Generally the horticultural industry is not willing to pay full value for the well-trained graduate, though he would pay his own way through savings made in operating expenses.

Turf managers today are worth more money than the common industry pay level. In many cases, they could be paid \$12,000 to \$18,000 yearly out of money wasted by inept construction plans. Few starting salaries are fair to the calibre of man graduating today in turfgrass or landscape management. You'll find plenty of jobs at the \$6,000 to \$8,000 level. Yet many employers would be both time and money ahead to pay the salary needed to attract better qualified people.

Our low pay philosophy drives many of our better men to competing fields. The effects then show up in industry shortcomings. Take the case of many almost new golf courses in California. Any number have at least one major construction mistake—the result of saving a few thousand dollars during planning and building. Poor planning and management are costly and the problem has been solved on the California courses only by reconstruction. Parts of courses have been rebuilt in the first five years at costs of up to \$100,000 and more. Less objection seems to stem from spending \$50,000 on rebuilding than an extra \$5,000 in the beginning.

Golf courses have plenty of

company when assessing rebuilding costs. Most of the big athletic arenas recently built in California have had turf problems. Hundreds of schools building athletic fields have settled for inadequate irrigation systems. Often they have also spent money on unneeded soil amendments—rather than putting money into the fertilizer needed to give them decent turf.

### Extra Costs Seldom Recognized By Industry

These and similar cases entail extra costs to the public, most of which go unrecognized. Practically all are caused by making wrong choices, poor design, and compromising on specifications. Research personnel who have the answers can only help during the rebuilding stage. They are reluctant to establish rigid guidelines because there is usually a flexibility of choice. Thus the calibre of the turf manager is most important in positions where he develops and carries out an effective and efficient construction plan.

Yet despite these needs, the graduate turf manager does not enjoy a labor market willing to pay adequately for his services. Too often, a substandard salary is offered.

Most consistent job opportunities today for our California graduates are in park adminis-

tration. We have placed students—based on their interests—in parks, in nurseries; with landscape contractors, golf course builders and landscape architects; helped them find positions as plant breeders, arborists, teachers, golf superintendents, floriculturists, garden writers, and as principal personnel in botanic gardens and arboreta; in laboratories, and in service and sales positions.

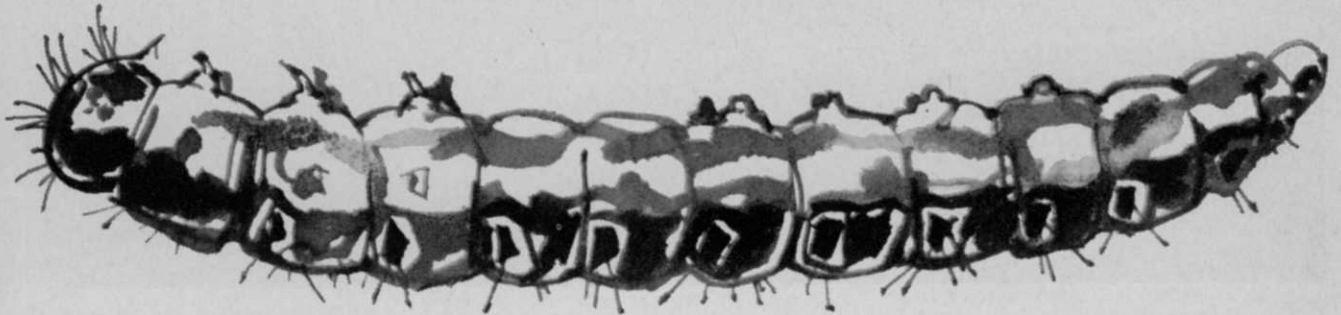
Personally, I feel that a prime future opportunity exists in a new form of golf course management. Surprisingly, many golf clubs of successful businessmen lack good business management. I think a void will be filled when some turf graduate leases equipment to, and contracts for maintenance services to several golf courses in one area. This can provide better maintenance and management at lower costs to the course, and at the same time provide good income to the manager.

By way of summary, I believe the sophisticated nature of turfgrass management today will lead to a recognition of the qualified manager. We need trained men to make correct choices during planning and construction—to prevent mistakes and accompanying waste and to eliminate costly rebuilding. When the value of highly trained men is more widely recognized, we will attract a new calibre of leadership to the turf industry.





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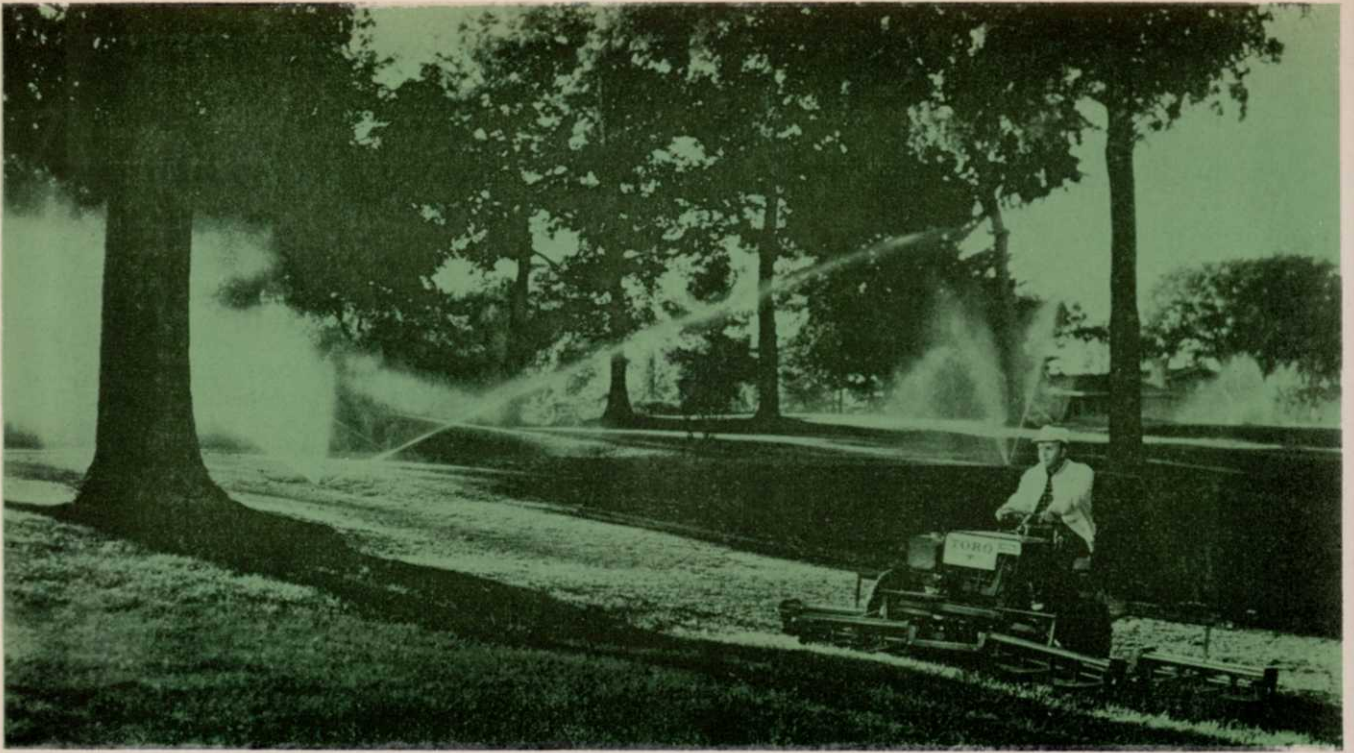
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# Watering Practices As A Function of Clipping Height and Frequency

BY J. R. WATSON

Director, Agronomy, Toro Manufacturing Corporation, Minneapolis, Minnesota

**T**URFGRASS watering practices are determined by a number of factors. Clipping height and mowing frequency may be among the more important agronomic influences. Others include the kind of grass, soil conditions and climate—length of growing season, distribution and amount of rainfall and evapotranspiration. The degree of color and the growth rate required to maintain the grass in the condition necessary to meet the demands of play, or other use, for which the turfgrass is grown, are important in determining watering practices. So likewise the capability of the irrigation system and, in the case of manually operated systems, the availability of labor exert a major influence on scheduling

and execution of watering programs.

There is very little documented information dealing with water use rates as affected by clipping height and frequency. It seems likely that evaporation and transpiration will be greater on a dense, closely clipped turfgrass area such as a putting green than will be the case on a more open turf cut at a height of two to three inches. If such is the case, then water requirements will be affected directly by clipping height and frequency.

Juska and Associates at Michigan State and at Beltsville, Maryland; Davis at Ohio State, Roberts at Iowa State and Madison at the University of California, Davis, all have shown

there is a reduction in root growth of a given species as a result of decreasing heights of cut. This, obviously, has a very direct effect on watering practices since maintenance of root zone moisture is one basic consideration of all sound watering programs. Hence, the frequency, rate of application and the amount of water applied at each irrigation are a function of clipping height and frequency.

Pertinent to a discussion of watering practices as a function of clipping height and frequency, is a short review of the role of water in plant growth, the influence of soil properties on root growth and the effect of mowing on grasses.

Water is essential to plant growth and activity and is in-



volved either directly or indirectly in all phases of the care and management of turfgrass. Water is necessary for germination, cellular development, tissue growth, food manufacture (photosynthesis), temperature control and resistance to pressure. It acts both as a solvent and as a carrier of plant food materials. Nutrients dissolved in the soil are taken in through the roots and then carried to all parts of the grass plant in water. The food manufactured in the leaves is also distributed throughout the plant body in water.

#### **Turgid Leaves Help Resist Traffic**

Water transpired by the leaves serves as a temperature regulator for the plant. The amount of water within the cells of the grass leaves plays a role in counteracting the effects of traffic. When the plant cells are filled with water, they are said to be turgid, a condition that helps leaves resist traffic (foot and vehicular). Hence, adequate water within the cells helps avoid the damage which may result when pressure (traffic) is applied to grass in a state of wilting. Wilt is a condition that exists when cells do not contain enough water. They are said to be flaccid.

For all these functions, very

large quantities of water are required and they, along with other considerations, must be kept in mind when developing a watering program for turfgrass.

In addition to watering practices, mowing influences turfgrass growth, development, maintenance and playability in a number of other ways. First, good mowing practices are one of the more important factors contributing to appearance—especially a well-groomed appearance—of any turfgrass area. Second, because of the regularity of the mowing process, grass cutting is the major time-consuming operation in the maintenance program. Third, the manner in which turfgrass is mowed will greatly influence its health, vigor, density, degree of weed invasion and longevity. Also, mowing is one of the factors limiting or controlling the adaptability or suitability of a given grass for turf purposes; and, since mowing practices must conform to the specific demands created by the use for which the turf is grown, it becomes one of the major management practices with which the turfgrass supervisor is concerned.

To be suitable for the production of turf, a grass plant must

be able to grow and persist under the environment to which it is subjected. Good turfgrass is judged by standards of playability and usability as the case may be, and unless a grass is able to survive under the type of maintenance demanded by players or users, it must be replaced or maintenance practices must be modified; otherwise, use must be restricted. For those concerned with the production of turfgrass, restriction of use always should be considered a last resort. The primary objective of the supervisor and grower is to produce high quality turfgrass suitable for use or play irrespective of environmental adversity.

More often than not, practices which are desirable for good grass growth have to be modified extensively to meet turfgrass requirements for use or play. As stated earlier, such is the case with mowing practices.

#### **Athletic Field Turfgrasses Limited In Number**

Turfgrass management practices, including mowing, severely limit the number of grasses that may be used to produce satisfactory lawns and playing fields. Only 25 to 30 of the more than 1100 species known to grow in the United States are adapted. Consequently, growth habits and characteristics play an important

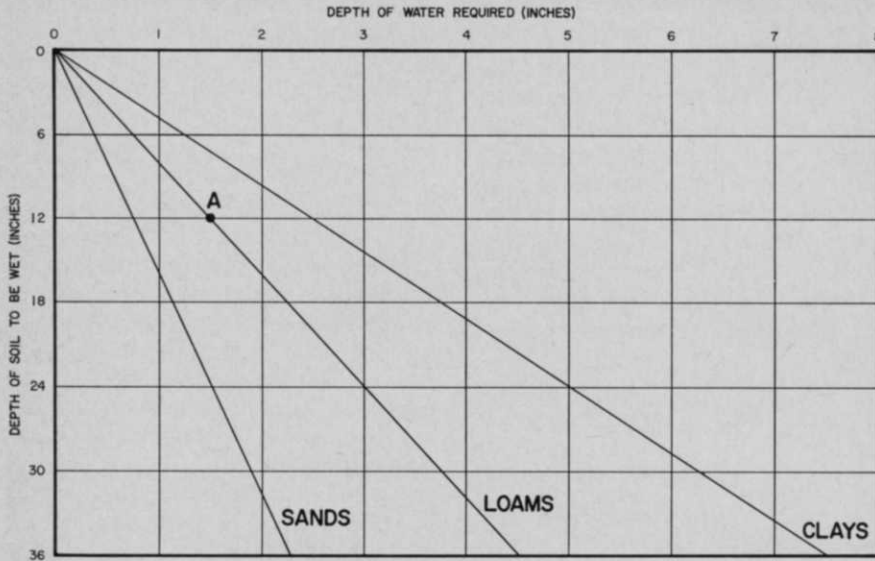


**Control box for automatic irrigation system** permits control of water applications with a minimum expenditure of time. Conservation of water and higher quality turfgrass are additional benefits cited for automatic irrigation systems.



**Underground automatic watering system** permits flexibility required for efficient operation. Watering practices based on grass needs and keyed to existing soil and climatic conditions assure high quality turfgrass, necessary for maintaining green color throughout season.

**Surface Inches of Water Required to Wet Soils To Given Depths  
Assuming No Surface Runoff**  
(Robert M. Hagan, Dept. of Irrigation, University of California, Davis)



HOW TO READ CHART: If a 12-inch depth of loam soil is to be wet, run down left-hand scale to 12-inch line; then across chart to diagonal line labeled "loam" (at Point A), and then project line vertically up to scale across top of chart. Depth of water required is 1 1/2 inches.

role in selection of a grass for turf purposes.

On the basis of growth type, grasses may be classified into three general groups. Bunch-type grasses, such as ryegrass and chewings fescue, produce new shoots which grow inside the sheaths of the previous stem growth. Stoloniferous grasses, such as bentgrass, spread by runners or stolons which develop from shoots that push through the sheath and run along the surface of the ground rooting at the nodes (joints). Kentucky bluegrass, a rhizomatous type of grass, develops shoots at the underground nodes. Some grasses, such as bermudagrass and zoysia grass, spread by both rhizomes and stolons. There are also intermediate types with decumbent stems which root at the nodes, such as crabgrass and nimblewill.

The grass leaf, because of its shape, intercepts a maximum of sunlight which is essential for photosynthesis (food manufacture). A reduction in the plant leaf area exposed to sunlight reduces the plant's capacity to carry on this vital function.

The ability of grasses to withstand frequent and relatively close cutting is related to certain peculiarities of the grass family. Grasses exhibit basal growth,

as opposed to terminal growth found in most other plants. Basal growth means simply that growth initiates at the base rather than at the tip of the blade or stem. From a practical standpoint, this means that normal and frequent mowing does not cut off the growing areas of the grass leaf. Removal of too much leaf surface at any one cutting may, however, destroy some of the growing points. For this reason, as well as from an appearance standpoint, grass should be mowed often enough so as to never remove more than one-third of the leaf surface at any one clipping.

**Management Practices Must Be Balanced**

To compensate for the reduction in root growth produced or caused by clipping, soil environment and management practices—fertilizing, watering, cultivating and programs of disease, insect and weed control—must be balanced one against the other and applied more intensively and with greater care. Development and maintenance of good soil properties are essential to satisfactory production of turfgrass. Soil properties relate directly to root development and are a major factor in developing watering practices.

Soil as the medium for turfgrass growth must provide support for the plant, serve as a storehouse for nutrients, supply oxygen, and act as a reservoir for moisture. The texture (size of soil particle), structure (arrangement of soil particle), and porosity (percentages of soil volume not occupied by solid particles) of a soil are the basic physical factors which control the movement of water into the soil (infiltration), through the soil (percolation) and out of the soil (drainage).

Texture, structure and porosity, along with organic matter content, determine the water-holding capacity and control the air-water relationships of the soil; hence, have a direct influence on root growth and development.

*Texture* (size of soil particle) is a most important characteristic of soils because it describes, in part, the physical qualities of soils with respect to porosity, coarseness or fineness of the soil, soil aeration, speed of water movement in the soil, moisture storage capacity and, in a general way, the inherent fertility of the soil. Sandy soils are often loose, porous, droughty and low in fertility; whereas, clay soils may be hard when dry or plastic when wet and poorly aerated, but high in moisture retention and possibly high in fertility. Clays have a higher total porosity than sands. Clays have a large number of small pores which contribute to a high water-holding capacity and slow drainage. Sands, on the other hand, have a small number of small pores with, therefore, a low water-holding capacity and rapid drainage.

*Compaction* of soil refers to a condition in which aggregation is reduced or absent; hence, the soil is dense (the number of large pores reduced). Degree of compaction at or near the surface is of special importance insofar as infiltration or movement of water into the soil is concerned. A thin layer of compacted soil materially reduces the rate of infiltration, and unless alleviated, often necessitates



a change in watering practices. Fortunately, since most of the compaction on turfgrass areas occurs within the upper two-inch layer of soil, the condition may be temporarily alleviated mechanically.

*Drainage*, or the removal of excess water from a soil, is of two types—surface and internal. Surface drainage is accomplished through grading and contouring of surface areas. Internal drainage is a function of the physical soil properties and has an important bearing on root growth and development as well as on watering practices.

On most turfgrass areas, one is usually able to apply water if soil moisture becomes limiting. In too many cases during periods of heavy rainfall, rapid percolation with subsequent removal of the excess water, does not take place. This is particularly true of many green and tee areas. Unless soils are adequately drained, many problems associated with saturated soils will arise.

#### Proper Watering Needed To Keep Grass Green

Supplemental irrigation is always necessary if turfgrass areas are expected to remain green throughout the growing season. The frequency of irrigation is governed by the water-holding capacity of the soil and the rate at which the available water is depleted. For the most vigorous and healthy growth, watering should begin when approximately forty to sixty percent of the available water has been depleted. Most plants show a marked growth response when soil moisture is maintained between this level and field capacity. Assuming equal depth of rooting, sandy type soils will have to be watered more frequently than will loams or clays. Climatic conditions such as high wind movement, intense sunlight, low humidity and temperature all contribute to high water use rates. Such conditions dictate more frequent watering than the reverse set of conditions.

The amount of water to apply at any one time will depend

upon how much is present in the soil when irrigation is started, the water-holding capacity and the drainage characteristics of the soil. Enough water should be applied to insure that the entire root zone will be wetted. Too, on natural soils (as opposed to those modified for intensive use) sufficient water should be applied to maintain contact with subsoil moisture and to assure percolation especially in arid and semiarid regions. Continuous contact between the upper and lower levels of moisture will avoid a dry layer through which roots cannot penetrate. Application of too much water at one time (misuse) is serious when the soil is poorly drained and the excess cannot be removed within a reasonable period of time.

Water should never be applied at a rate faster than it can be absorbed by the soil. Sprinklers that do not adequately disperse water, as well as sprinklers that deliver a large volume of water within a concentrated area, cause surface runoff. Whenever water is applied at a rate faster than it can be absorbed by a given soil, the water is being wasted. The sound watering program, then, would call for sprinklers that apply moisture slowly enough to permit ready absorption. When surface conditions such as compaction exist, it should be corrected by cultivation (aerification) or spiking. Such will materially improve the infiltration rate of water.

Once surface runoff is evident, sprinklers should be turned off. If the soil has not been wet to the desired depth—this may be determined by probing and examining the depth of penetration—then the sprinklers may be turned on again at the end of thirty minutes to an hour, depending on the permeability of the soil.

In summary, watering practices are a function of clipping height and frequency because of the relationship between clipping height and root development. Grasses clipped within the generally recommended height of cut range for the given species will produce adequate

root growth provided a satisfactory management program can be followed. Sound watering practices are necessary to assure satisfactory growth of roots.

To use water properly requires an understanding of the fundamental role water plays in plant growth; of the effects climate and weather have on growth rates; how they influence water use rates and choice of grass. Good watering practices demand a knowledge of the basic physical and chemical soil properties, how they affect water absorption, storage and drainage as well as the frequency, rate and manner in which water must be applied.

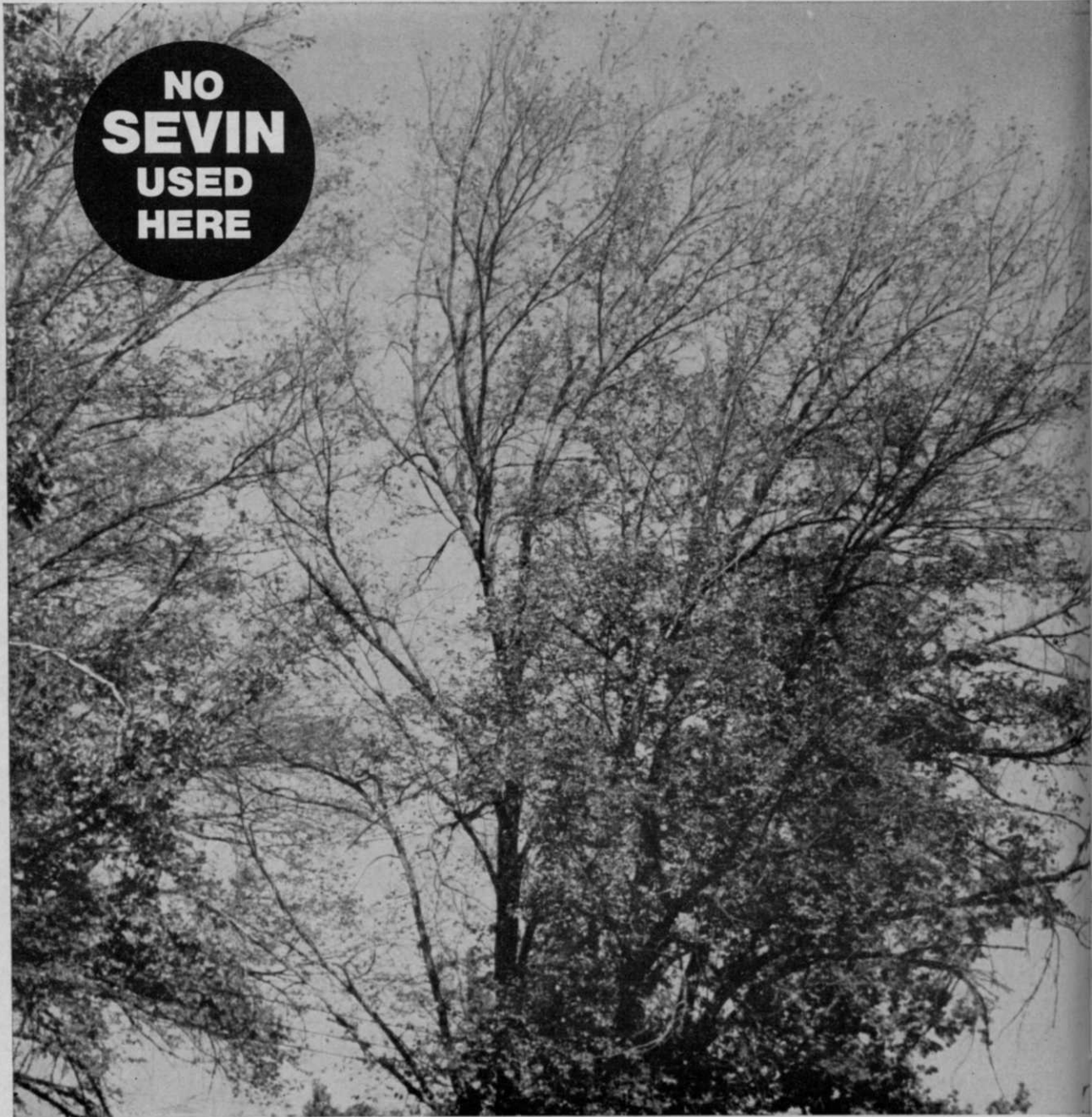
Further, proper use of water means correlating such basic information with the requirements for play and programming a watering schedule to fit the existing irrigation facilities, so as to make the most efficient use of them and the available labor force.

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Successful stand of sericia lespedeza was seeded on this Union Electric right-of-way after clearing and spraying.



Oak root shows typical sprouting 2 years after clearing and prebasal spraying on Union Electric test plot.



Tordon 10K tends to stimulate grass cover, especially after first year. Plot was treated in 1964 at 80 pound rate.

# Right-of-way Brush Control— Multimillion Dollar Management Problem For Industry

SUPPOSE you had to wear the company hat of a supervisor responsible for brush control and tree clearance on 7000 pole miles of rights-of-way. Your first concern would likely be getting the job done right and keeping costs in line insofar as you were able.

This is the position of Ray Bruns, forester for Union Electric Company at St. Louis, Mo., where he handles clearing and maintenance on the company's distribution lines. These are lines ranging in power from 34KV through 54KV. Six years ago when he joined Union Electric in this position, he questioned the expenditure of \$80 to \$100 per acre to spray stumps on newly cleared rights-of-way. Complete kill, meaning root kill, was only about 40% and much less in many cases. Methods used consisted of chemical applications to the cut surface and collar area of stumps at the time of initial clearing.

Early tests were based on the established practice of spraying

newly cleared areas. A kill of 60% was deemed necessary to justify the cost of stump spraying. Various company products were used, but of the various esters of 2,4,5-T and 2,4-D, none indicated sufficient root kill to justify the cost. Result was that the practice of stump spraying on initial rights-of-way as these were cleared was eliminated. Other methods were explored

via a continuing testing program.

Dow Chemical Company's Tordon 10K brush killer pellets proved to be the single chemical tested which met company requirements. All tests were made on newly cleared rights-of-way near Wright City, Mo., which is about 60 miles west of St. Louis. The area tested is rather rough, hilly land with rainfall of 32-34

Donald J. White, left, assistant forester, and Raymond R. Bruns, forester, both of Union Electric Company, discuss latest results on their chemical vegetation control test plots. Now in final phase, they expect to make recommendations to company for broad use this fall.







**Dormant broadcast** spray has been used on practically all distribution lines. Union Electric Company crew above sprays right-of-way.



**Company built** flail unit for use by maintenance crew is used to clear right-of-way of brush growth. Unit is pulled by crawler tractor.

inches each year. Foliage is mostly oak and hickory with some elm, mulberry, ash persimmon, maple and sassafras. Other types also crop up in very limited numbers. All Tordon 10K tests, based on twice-a-year recounts over a 3-year period, showed more than 90% kill. Other tests which failed during this period beginning in 1964 included prebasal spraying of trees 6 weeks prior to cutting, prebasal spraying 24 hours prior to cutting, and stump spraying immediately after cutting. Little difference was noted in the different time elements on prebasal spray tests.

#### **Chemical Applied After Clearing Brush**

In the successful test, Tordon 10K pellets were applied as a broadcast treatment to control stump and root sprouting. Application was made by a Hurricane seeder on 9 plots. Edges of plots were broadcast by hand for careful control. Three Dow representatives, Hoyt Nation, Hal Dilsworth and Larry Berra, worked with Union Electric representatives on this particular test.

The Tordon 10K pellets which are manufactured by Dow contain 11.6% active ingredient of 4-amino-3,5,6-trichloropicolinic acid as the potassium salt with an acid equivalent of 10%. Six plots using rates of 60, 80, and 100 pounds per acre were treated with Tordon 10K pellets. Each plot comprised about 1/5 acre and all treatments were made April 16, 1964. The right-of-way

which was treated had been cleared about 2½ weeks earlier, on March 26.

Tree numbers on the treated plots were estimated at 250 stumps per 1/5 acre plot. An actual count was not made since a series of similar plots comprising four additional test areas were checked by count on either side of the Tordon 10K test area. Actual counts on these plots approximated the 250-tree per plot estimate. Check strips, half the size of each plot, were left untreated as a control check in each instance.

Results of the tests which will be finalized after the 8th recount (due this fall and 3½ years after application) will determine the recommendations to be made to Union Electric engineering and construction administrators. Following the 6th recount, made after 2½ years, root kill results are as follows:

92.2% kill at 60 lbs./acre  
 93.0% kill at 80 lbs./acre  
 96.8% kill at 100 lbs./acre

If these results hold after the 8th recount, and Bruns believes they will, then recommendations will be made to treat all newly cleared rights-of-way with Tordon 10K pellets at a rate of 60 pounds per acre. Estimated cost of Tordon 10K at bulk rates will likely be about \$1 per pound. Thus, each additional 1% kill over 60 pounds per acre would cost about \$10 more for each acre treated. Bruns estimates that kill will be adequate for 10 to 12 years which in effect de-



**Each metal** tooth or chain which is used for flail unit weighs 75 pounds and literally beats brush crop back.

lays maintenance treatments and also allows more selective handling of tree species.

In this particular area, original line clearing costs have been running \$300 to \$500 per acre. This includes use of bulldozers, sawing crews and either windrowing alone or windrowing and burning, depending on the area. Also company policy is to remove any standing dead trees adjacent to such rights-of-way. Clearance and spraying on new rights-of-way have been handled by contract on a cost plus man-hour basis. In cases of liability, all claims are the responsibility of the contractor. Seven line clearance foremen administer the contract in the field. The company in previous work where spraying has been done has specified only chemicals and the concentration to be used.

Maintenance work is normally handled by contract crews on the distribution lines which are the responsibility of Bruns. Dormant broadcast spraying for maintenance is also handled by the contract.

Bruns believes that change in

**Stump Treatments With Tordon 10K On Union Electric Test Plots Near Wright City, Mo., Showing Results of 6th Recount Made October 4, 1966**

**Check Strip D-1 (Treated at 60 Pounds Per Acre)**

Species	0-2	Collar Sprouts by Stump Diameter					Total	Root Sprouts	Total Sprouts
		2-4	4-6	6-8	8-10	12+			
Oak	4	2				1	7		7
Hickory	3						3	3	6
Ash		1					1		1
Elm	1						1		1
Wild Cherry								2	2
<b>Total</b>	<b>8</b>	<b>3</b>				<b>1</b>	<b>12</b>	<b>5</b>	<b>17</b>

**Check Strip D-6 (Treated at 60 Pounds Per Acre)**

Species	0-2	Collar Sprouts by Stump Diameter					Total	Root Sprouts	Total Sprouts	
		2-4	4-6	6-8	8-10	12+				
Oak	3	1					2	6	3	9
Hickory	2		1					3	1	4
Elm	3	1			1			5	1	6
Wild Cherry									3	3
<b>Total</b>	<b>8</b>	<b>2</b>	<b>1</b>		<b>1</b>	<b>2</b>	<b>14</b>	<b>8</b>	<b>8</b>	<b>22</b>

**Check Strip D-2 (Treated at 80 Pounds Per Acre)**

Species	0-2	Collar Sprouts by Stump Diameter					Total	Root Sprouts	Total Sprouts	
		2-4	4-6	6-8	8-10	12+				
Oak	3	1					5	9	5	14
Hickory	3							3	3	6
<b>Total</b>	<b>6</b>	<b>1</b>				<b>5</b>	<b>12</b>	<b>8</b>	<b>8</b>	<b>20</b>

**Check Strip D-7 (Treated at 80 Pounds Per Acre)**

Species	0-2	Collar Sprouts by Stump Diameter					Total	Root Sprouts	Total Sprouts	
		2-4	4-6	6-8	8-10	12+				
Oak	4	2					1	7	1	8
Elm		1						1	3	4
Hickory	1							1	2	3
<b>Total</b>	<b>5</b>	<b>3</b>				<b>1</b>	<b>9</b>	<b>6</b>	<b>6</b>	<b>15</b>

**Check Strip D-3 (Treated at 100 Pounds Per Acre)**

Species	0-2	Collar Sprouts by Stump Diameter					Total	Root Sprouts	Total Sprouts	
		2-4	4-6	6-8	8-10	12+				
Oak		2		1			3	6	3	9
Wild Cherry									3	3
<b>Total</b>		<b>2</b>		<b>1</b>		<b>3</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>12</b>

**Check Strip D-8 (Treated at 100 Pounds Per Acre)**

Species	0-2	Collar Sprouts by Stump Diameter					Total	Root Sprouts	Total Sprouts	
		2-4	4-6	6-8	8-10	12+				
Oak							1	1		1
Elm	2							2		2
Wild Cherry									1	1
<b>Total</b>	<b>2</b>					<b>1</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>4</b>

both chemicals and methods will continue to be the rule in the industry. Much has already been learned about kill and more will come. Research is being done by both public institutions and by private industry throughout the nation. Bruns believes this to be necessary. Because of variations in climate, soil, land use, terrain and species, test results with chemicals have not always been reliable in all areas. Bruns points out that these same variables exist within the service area of Union Electric which covers parts of Missouri, Illinois and Iowa. Answers to specific problems, he feels, must be solved sectionally. For example, he personally favors company tests on a field basis rather than those by technical personnel under controlled conditions.

In light of this, he believes it will be necessary for Union Electric and others to continually re-appraise vegetation control methods and do considerable experimenting to keep costs in line and at the same time handle the job adequately on their ever-expanding facilities.

*A WTT staff report based on vegetation control chemical tests of Union Electric Company, St. Louis, Mo. Supplying data for the company were Raymond R. Bruns, Union Electric Forester, and Donald J. White, Union Electric Assistant Forester.*

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Purdue University research horticulturists use a new type of buckwheat root-growth test. Called a bio-assay, it involves growth of the roots under controlled temperature. The test is sensitive to 50 parts per billion.

Purdue scientists have used the new method to study rate of decomposition of two weed killers, IPC and CIPC. Their tests showed no evidence of either within 4 weeks following application.



# Successful Arborists Today Are Good Business Managers

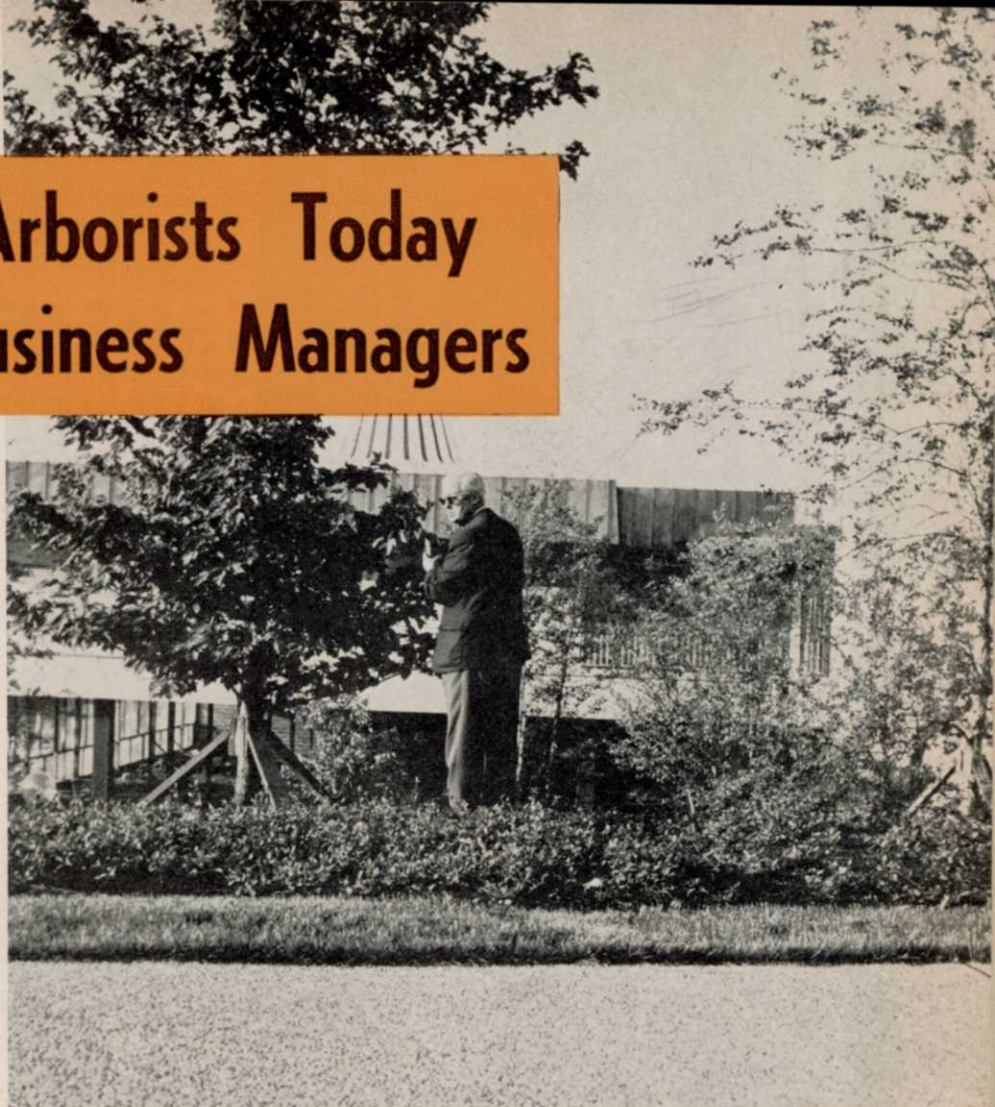
*A WTT staff report based on an interview with F. L. Dinsmore, founder and senior partner of Dinsmore Tree Service Company, St. Louis, Mo.*



Knowing how to grow and care for trees doesn't insure success in the tree business today. The arborist has found he has had to become a businessman, and a good one to survive. Experience in tree culture is still a valuable asset. The same can be said for customer service. But experience and happy customers do not guarantee the income needed to pay labor, maintain a modern office, carry liability insurance, and buy the expensive equipment needed to operate.

These are facts of the business. Successful arborists accept them. Typical among those who represent the operator today is F. Lewis Dinsmore, Dinsmore Tree Service, St. Louis, Mo. Dinsmore has spent 40 years in the business as an employe, as a self-employed lone operator, and as manager and owner of a going concern for the past 35 years. He is a businessman.

Experience coupled with business acumen has paid dividends for Dinsmore. He uses experience to keep shop time to a minimum. Shop time is the unproductive hours when employes are on the payroll and earn time which cannot be assigned to a particular job. This reduction in shop time and a number of business principles combine to make the Dinsmore Tree Service one of the best in the country. Dins-



**Planners for Northwest Plaza Shopping Center, St. Louis, Mo.,** one of world's largest, included 600 trees in the development to enhance its beauty. F. Lewis Dinsmore, checking newly planted tree, was one of 4 Metropolitan St. Louis arborists invited to bid on the planting. Result was that the 4 pooled their bids and handled the job on a partnership basis to the mutual benefit of both developer and tree companies. Partners in the major venture were Teston Tree Treatment Company, Suburban Tree Service, Shield Shade Tree Specialists, Inc., and Dinsmore Tree Service.

more's practices are the type which have been used by many arborists, some more successfully than others. Though by some standards Dinsmore's operation, which consists of about 20 employes, is small, it is typical of the vast majority of tree service businesses today.

Take his rules for keeping down shop time hours. They have come as a result of experience and service to longtime customers. Rule No. 1 consists of zoning the St. Louis area. In short, Dinsmore has laid out his own system of zoning to fit the areas he serves. He covers the greater metropolitan St. Louis area but still finds his business concentrated more in some areas than in others. In determining size and scope of zones, the num-

ber of customers and the type of business is taken into consideration. Each foreman is assigned a zone for which he becomes responsible. This works especially well for the usual types of spraying, but tree work is also handled in this manner. By having a zone to work, foremen save travel and route time by careful scheduling. They do very little backtracking. "Jobs are not handled as they come in but by where they are located, that is," Dinsmore says, "if people will stand for it." Spray work, for example, is scheduled in advance to take advantage of the zone system. Customers are assured that their work will be done "at the proper time."

Annual service contracts are perhaps as important as any one factor in reducing unproductive





**Attractive and modern office headquarters** which is located in affluent suburban area has proved a business asset for Dinsmore Tree Service. Formerly, warehouse and tree lot were located at side and behind this building. When the site became a high tax area, Dinsmore purchased outlying land for a new warehouse and built 5 adjacent store buildings which he now leases to retail businesses.

jobs. This, he says, eliminates the lost time crews use by stopping for coffee enroute to the job. Further, it boosts employee morale and saves the worker spending out-of-pocket change on the job. The employee thinks the free coffee and donuts are a good deal, and a favor from the company. Dinsmore believes this practice does more than save time. Along with the banter, normal in a coffee session, he finds that the men exchange job experience and gain from the morning sessions.

#### **Foreman Lives At Site of Nursery**

Another shop time saver is housing one foreman, Harry Elkins, in a home at the nursery. Elkins does the tree digging with power equipment and is always on hand to help the driver load a tree. This saves sending an extra man along to pick up the usual tree. Also, if the wind is too high for spraying, Elkins stays on the job at the nursery. Here, there is always work filling holes and lining out new seedlings. Besides replacing trees in the nursery lost by sales, Dinsmore has been increasing his nursery tree stock at a rate of about one acre each year. This permits him to keep up with the increased demand.

Power equipment used to dig trees consists primarily of a Da-

hours. These, coupled with new jobs permit foremen more leeway in scheduling. Summer spraying and dormant oil spraying during late winter or early spring can be scheduled well in advance and an efficient route schedule planned.

Many longtime customers are not on annual service contracts but expect Dinsmore Tree Service to provide them regular service. Dinsmore reaches these people, and others as well, by mail. He uses direct mail service to about 3000 selected customers each month. These mail pieces are reminders to call in for service, aimed at keeping last minute scheduling to a minimum. Just because Dinsmore provides a service to a customer in his prime target area does not qualify that customer for direct mail service. This service is limited to longtime private and commercial customers rather than to the customers who only use a professional arborist for emergency and special jobs. Copy in the direct mail pieces usually concerns spraying, tree moving, and general tree care. He also reminds customers that trees are available.

Direct mail is the only type of advertising which Dinsmore uses on a regular basis. Like other businessmen he supports community ventures such as school yearbooks and the like. But general advertising as such has never been a practice of the company. He has found that regular customers and referrals have combined to keep his crews busy through the years. Much of this

must be attributed to providing good service at a fair price.

Dinsmore readily admits that profits in the business today depend on spraying and tree moving. This makes careful scheduling and timely service even more important. Recognizing this, general tree work is planned around these more profitable phases of the business and used to keep men employed.

When conditions are unfit for spraying, such as on mildly windy days, men can be deployed to pick up waiting tree work.

Free coffee also cuts unproductive hours. Dinsmore keeps a big coffee urn full of fresh brew for his crews; has it ready along with donuts or cookies a half hour before they leave on

**Carl Hess, left,** will shortly celebrate his 35th anniversary of service with Dinsmore Tree Service. Assisting him in checking scheduling is Mrs. Charlotte Allen who has become a specialist in handling telephone customers.





vis trencher with hillside attachment. Dinsmore says a square trench is dug some 6 to 8 inches greater than diameter of the ball will be. Once trenching is done, roots are fine cut with a sharp spade and the ball hand shaped round with the spade.

Finally, Dinsmore follows the practice of keeping well-trained men as the hard core of his business. These men are hired on a full-time basis and guaranteed year-round labor. Part-time help is hired for seasonal work.

Probably more important than the productive hours saved by Dinsmore's management practices is his business acumen. He uses the best principles now available to the small businessmen. An auditor furnishes him a monthly report. This report, drawn by the auditor from book-keeping entries supplied by Dinsmore's Girl Friday, gives costs of sales, a statement of condition of the business, and a profit-and-loss statement. He uses this monthly information on which to base his prices. Dinsmore operates on the theory that you can't wait the better part of a season to learn whether the small percentage increase being paid for materials is affecting the profit structure. He doesn't believe price is the key factor in gaining and holding customers. Most of the private customers who make up 80% of his business, and the remaining 20% who are commercial accounts, are more interested in service and reliability than in a few dollars less on the cost of a job.

#### Clients Select Own Trees

Another business practice aimed at client satisfaction is making sure that trees planted by the company fit the location and surroundings and give the effect which the purchaser is seeking. For this reason, Dinsmore shows his nursery trees by appointment. In the case of a homeowner, if he isn't familiar with the homesite Dinsmore makes arrangements to pick up the husband and wife. This lets him assess the situation and later guide them in selection at the nursery. Some 99% of his customers tag their own trees at the

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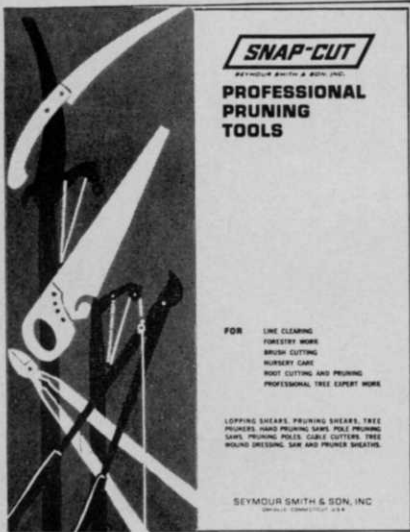
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nursery. Dinsmore selects trees only for commercial accounts and a very few longtime customers. Occasionally he will select a tree for a client after making it clear that once the tree is planted it cannot be returned. Through the years this practice has paid dividends in customer relations. He finds that once customers have selected a tree and have it planted at their home, they are always pleasantly surprised at how much greater in size the tree appears. This is a plus factor common to the business. If a customer questions price of a tree, Dinsmore frankly appraises them of the fact that the arborist is primarily selling time, meaning the time to grow the large, carefully nurtured shade tree.

### Large Accounts Usually Advantageous

Big, new commercial developments are tempting to the arborist. The chance to bid and win the big account is usually advantageous, but for only one year. This may be good, but it can usually be handled only by sacrificing service to regular accounts. When Dinsmore was one of four St. Louis tree companies invited to bid on the huge, new St. Louis Northwest Shopping Center tree program, a center which is one of the largest in the world and which has probably spent more to beautify the area with trees than any, he first considered the effect this one-season project would have on his business. As a result, he got together with the three other companies invited to bid and suggested they pool their efforts and resources and submit one bid. This proved to be satisfactory with the developer and a happy arrangement for the arborists. Result was that the four divided the 600-tree job both dollarwise and by numbers and each was able to supply the type of trees most available to him via his nursery or other channels. In this way, all were able to handle what has proved to be a masterful accomplishment and at the time protect service to their regular customers. Dinsmore regularly handles a number of large

commercial accounts including McDonald Aircraft, Monsanto and others.

A business practice available to any arborist is that of studying the practices of others in the business. Dinsmore reports that through the years he has carefully studied large operators, applying some of the principles to his own business. For example, he has moved when necessary. He found that increased taxes made his warehouse and tree sales lot too valuable a property for these purposes. So he purchased a site about one mile from the original office and warehouse and built a new 4000 square foot building to fit his operation. He maintained his headquarters and office at the original site and built five additional store buildings which he rents to suburban Ladue retail outlets. Also, he has bought and sold nursery acreage and at the same time retained the most valuable portion of his original nursery.

Equipment must be kept busy to be profitable. Dinsmore buys equipment as needed, but will not purchase equipment which he cannot justify despite the temptation. He says it is impossible to justify the price of a crane since it cannot be used on a regular basis. When the need arises, he leases a Bucyrus-Erie crane with 90' boom. Cost including an experienced operator is only \$20 per hour. This is used to take down large trees and to plant trees on terraces, permitting the firm to take jobs which originally could not be handled. Also rented as needed is a low-boy truck since this is another piece of equipment seldom used.

Dinsmore originally started his career in 1928 as a tree man with the Davey Tree Company. After a short training period, he started working with Davey at Portland, Me., and later at Boston, Mass. He started on his own in a small way in 1931. Dinsmore believes that establishing a nursery was probably the big step toward success and growth in his business. Prior to this he had to locate available trees and cart his customers to them. He started the first trees at the



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Penick offers a comprehensive variety of formulations for the control of mosquitos, including resistant strains and disease-bearing species, small flying insects, mealybugs, aphids and other turf pests. Combining high killing power with very low mammalian

toxicity, these stable, low-odor pesticides are quick-acting and can be stored for extended periods. They're economical, too. Malathion's unique "reach-out" capability is just one economy factor. We can tell you about a number of others. Just ask us.

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nursery in 1935. All are planted in three or four rows on 12'x12' squares beside 20' roadways. This permits easy access for care and removal. Dinsmore now has about 70 species of deciduous trees in the 110-acre nursery, all of which is not yet in trees.

Associated with Dinsmore in the business is his brother, W. T. Dinsmore, who owns a minority

share and is also a longtime arborist. W. T., known among arborists as "Red," lives on a farm 24 miles southwest of the Ladue office and maintains a small tree nursery along with working actively on a full-time basis in the business.

For the future, Dinsmore predicts an acceleration in business

for the industry. More people with greater appreciation for tree beauty will continue to increase the demand. Dinsmore points to the growth of garden clubs, the moving of businesses from railroad sidings to highways where they are developed into showplaces, and overall strength of the economy. These factors, he believes, are keys.

### Dinsmore Shop Time Savers

1. Zoning the area served to save backtracking by crews.
2. Annual service contracts for advance scheduling.
3. Direct mail to regular clients as reminders for coming seasonal work and to help increase advance scheduling.
4. General tree work handled during slow periods.
5. Company coffee to eliminate enroute coffee stops.
6. Housing located at nursery site.
7. Maintaining hard core of year-round experienced men and supplementing with part-time labor.

### Dinsmore Business Principles

1. Use of monthly audit report on which to base many business decisions.
2. Assuring client satisfaction by getting buyers to select and tag own trees.
3. Protecting service to regular private and commercial clients by careful selection of new and large commercial accounts which might jeopardize company's record for customer service.
4. Studying business practices of other arborists, particularly large operators, for principles applicable to his own business.
5. Leasing equipment which is expensive and necessary only for infrequent jobs.
6. Maintaining own nursery.

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### New **LINDIG** Low-Temperature Aerated Steam System



Lindig offers the first commercially available Soil Cart and Steam Aerator for preferred low temperature aerated steam treating of soil.

This fast, efficient system fills the demand for low-cost safe control of plant-damaging micro-organisms, insects, virus, and weed seeds in soil mixes. When soil materials are heated to 145°-165° F. for a period of 30 min. most harmful elements are destroyed, but beneficial bacteria retain their vitality and capability to suppress mold causing patho-

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Less than an hour is needed to raise temperature and treat cart capacity of 48 cu. ft., using normal steam line pressure. Aerator can also be used to cool soil after treating. Treat large quantities by setting up continuous system with one aerator and several carts. Aerator available in 350 CFM size. Cart Cover and 18" probe type Temperature Gauge available as accessories.

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## Insect Report

WTT'S compilation of insect problems occurring in turfgrasses, trees, and ornamentals throughout the country.

### Turf Insects

#### ENGLISH GRAIN APHID

(*Macrosiphum avenae*)

**Delaware:** On ryegrass in Kent County.

#### MAY BEETLES

(*Phyllophaga* spp.)

**Arkansas:** Emergence heavy in central and southern areas; light in northwest. Damaged golf greens by digging into ground for ovipositing.

#### A JOINTWORM

(*Harmolita opuntiae*)

**Utah:** Caused numerous galls on a short grass, evidently *Hilaria* sp., in Cisco and La Sal area of Grand and San Juan Counties, and near Cedar City, Iron County. High incidence of these galls in some localities.

#### VEGETABLE WEEVIL

(*Listroderes costirostris obliquus*)

**California:** Larvae and adults heavy on grassland at Lemoore, Kings County.

### Ornamentals

#### AN APHID

(*Neophyllaphis araucariae*)

**Florida:** Adults infesting all podocarpus inspected at nursery in Ft. Lauderdale.

#### BAGWORM

(*Thyridopteryx ephemeraeformis*)

**Oklahoma:** First small larvae of year on evergreens in Stillwater area of Payne County.

#### NATIVE HOLLY LEAF MINER

(*Phytomyza ilicicola*)

**Virginia:** Adults emerging on Eastern Shore. Damage to holly extensive in 1966; should be severe in 1967.

#### A LEAF ROLLER MOTH

(*Argyrotaenia* sp.)

**California:** Medium on roses at Encinitas, San Diego County.

#### A PLUME MOTH

(*Platyptilia antirrhina*)

**California:** Larvae heavy and boring on snapdragon stems at Sacramento, Sacramento County.

#### ARMORED SCALES

**Alabama:** *Fiorinia theae* crawlers heavy on camellia and Burford holly and *Unaspis euonymi* crawlers heavy on euonymus in Lee County. **California:** *Aspidiotus nerii* medium on New Zealand flax nursery stock at Los Banos, Merced County. A.

*camelliae* heavy on camellia nursery stock at Vista and Encinitas, San Diego County.

### Tree Insects

#### A BARK BEETLE

(*Xylosandrus compactus*)

**Florida:** Adults associated with cypress twigs and killing twigs of red-bay at Gainesville.

#### ELM LEAF BEETLE

(*Pyrrhalta luteola*)

**New Mexico:** Moderately heavy populations feeding on elm trees in Belen area, Valencia County.

#### EASTERN TENT CATERPILLAR

(*Malacosoma americanum*)

**Connecticut:** Hatching observed at East Windsor and Naugatuck. **New York:** Emergence observed in Ontario County. **Ohio:** In Mohican State Forest, Ashland County, larvae small but common on wild cherry trees. Webbing more common in this area than last year. **Oklahoma:** Larvae preparing to pupate in Major County. **Virginia:** Small tents visible on Eastern Shore.

Compiled from information furnished by the U. S. Department of Agriculture, university staffs, and WTT readers. Turf and tree specialists are urged to send reports of insect problems noted in their areas to: Insect Reports, WEEDS TREES AND TURF, 1900 Euclid Ave., Cleveland, Ohio 44115.

Spread it on. Or spray it on. Either way, you get a fast and easy kill of broad-leaved and grassy weeds with Hooker MBC.

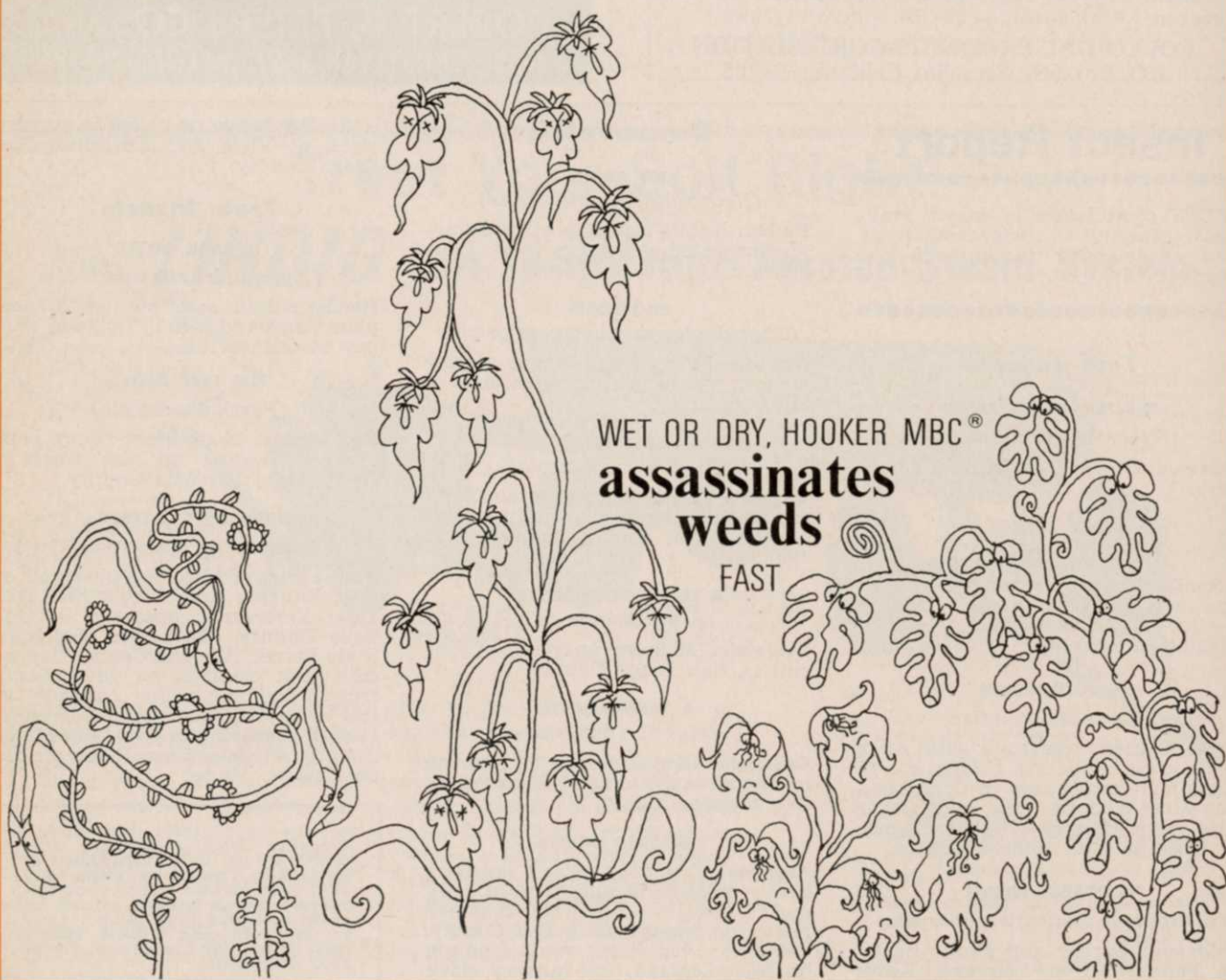
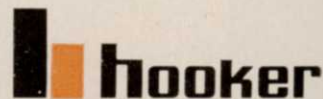
MBC leaches into the soil after rain or irrigation. Attacks roots. Sterilizes the soil for a season or longer. It kills top growth almost on contact.

MBC wipes out such hard-to-kill pests as Johnson grass, bur rag-

weed, hoary cress, and bindweed along ditches, roadsides, and on industrial and other noncrop land.

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**weeds**  
FAST



# Introducing 0217 Brand, Fylking Kentucky Bluegrass A Kentucky Bluegrass Adapted To Close Mowing

By DOYLE W. JACKLIN

Turf lovers have long wished for a turf with the good color, density and hardiness of Kentucky bluegrass yet which would stand up to extremely close clipping. A new dwarf bluegrass now available in limited quantities, meets this requirement and goes far beyond it to offer outstanding advantages over most other grasses both for golf tees, greens aprons, low-mowed fairways, and for home lawns.

The new variety, now being registered under its test code number 0217, is Fylking Kentucky bluegrass. The first seed was produced at the famed Svalof plant breeding station in Sweden. It was brought to this continent ten years ago by Arden W. Jacklin, president of the Jacklin Seed Company of Dishman, Washington. Since then Hogg & Lytle Seeds of Oakwood, Ontario, have been associated with Jacklin in testing and developing the variety for Canadian use.

The reason why Fylking can withstand closer mowing than

many other Kentucky varieties is due to its low-growing nature. It has a short leaf sheath, moderately prostrate leaf blades, a fairly slow rate of vertical growth and the ability to maintain a high quality leafy turf during seed setting time in the late spring. This is the time when many other varieties become spindly. It can be safely recommended for use on tees and aprons of greens because it readily tolerates cutting heights of  $\frac{1}{2}$  to  $\frac{3}{4}$  inch and has grown well under prolonged cuttings at  $\frac{3}{8}$  of an inch.

Table I illustrates the superior color ratings of Fylking received in recent North American testing.

Among the other desirable characteristics of Fylking, which extensive testing has revealed, is the speed with which it becomes established. Under optimum conditions sod lifting time has been reduced to six or seven months after planting. Even under less favorable conditions, September seeding should be ready for lift-



**New sod variety, 0217, Fylking Kentucky Bluegrass, will shortly be available. Note rhizome development in sod plug 12 months after seeding. Tests indicate that new sod is adapted to close clipping and possesses desirable qualities of color, density, and hardiness.**



**Note vitality of sod strip of 0217 lifted 10 months after seeding.**

ing by late spring or early summer.

An important phase of the widespread testing program was obtaining reliable data on the disease resistance of Fylking, test coded as 0217. Results in this area are most promising. A number of Kentucky bluegrasses have been particularly susceptible to leaf spot. Its various strains have probably damaged more Kentucky turf than any other disease. Fylking has shown excellent to outstanding leaf spot resistance. It also has excellent resistance to stripe smut



How fast can you say...

# chop!



No matter how fast, it won't be faster than the high-velocity cut-off unit on a RYAN Heavy-Duty Sod Cutter (photo).

Chop! Just like that you get a clean, absolutely square and vertical end cut... automatically. And right on the button to the exact length you're pre-set from 1 to 9 feet.

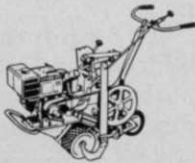
This ability to cross-cut sod as you go is just one of many reasons RYAN is the first choice of 9 out of 10 commercial sod cutters.

Another? Production... up to 15,000 square yards of perfect sod per day.

Another... visibility. The operator sees and follows the previous cut at all times... strips the field clean without a bit of waste.

For still other reasons why a RYAN will cut better sod faster (sod that lays better and faster, too), write today for the new RYAN Heavy-Duty Sod Cutter Bulletin.

For an easy to move companion unit, choose the RYAN JR. SOD CUTTER



Highly maneuverable in restricted areas, easy to move from job to job, the famous Ryan Jr. cuts 100 sq. ft. of sod per minute. Cuts a 12" strip up to 2 1/2" thick. Write for Bulletin!

Manufacturers of aerators, renovators, vertical mowers, spreaders, rollers, and sod cutters.

**Ryan** EQUIPMENT COMPANY

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TABLE I. Turf Color Ratings\*

	1964	1965	1964	1965	1964	1965	1964	1965	1964	1965
Fylking	1	1	1	2	1	1	1	1	3	2
Merion	1	1	2	3	3	2		2	1	1
Windsor			4	4	2		3			
Newport				6	4	3			2	3
Park				5	4	4		3		
Common Ky			3	1	6	5	2	4	4	
	N. York		Conn.		Ohio		Minn.		Wash.	

\*States included in Table I were selected as accurate representatives of test results received from all states. Varieties are rated in order of excellence.

and is one of only three commercially available bluegrass varieties which has resistance to this disease. Its stem and leaf rust resistance is rated as excellent and resistance to powdery mildew and Fusarium roseum is average or slightly above. In comparison with other varieties in Table II, Fylking was again rated as having out-

standing disease resistance characteristics.

The 0217 testing program has been carried on throughout the temperate zone of the United States and Canada and even into Mexico. The many private testers, institutions, experimental stations and homeowners who cooperated in the program provided a nonbiased yet extreme-

TABLE II. Disease Resistance

Rust*	1964	1965	1964	1965	1964	1965	1964	1965	1964	1965
Fylking		2	1	2	2				1	
Merion			3	4	3				2	
Newport		1	2	3						
Windsor		2								
Cougar				1						
Common Ky			3		1					
K 5 (47)		3								
	Ind.		Wash.		Minn.		Ill.			
Leafspot*	1964	1965	1964	1965	1964	1965	1964	1965	1964	1965
Fylking	2	1	1	2		2	1	1	4	3
Merion	1	2	2	1		1	1	1	1	1
Newport	4	3	4	3				2	2	2
Park				4						
Windsor	3		3							
Common Ky	5	4	5	5					3	4
	N. Jersey		Ohio		Minn.		N. York		Wash.	
Powdery Mildew*	1965				1965					
Fylking				2						3
Merion				3						1
Newport										2
Windsor				2						
K 5 (47)				1						
	Ind.				Calif.					

\*States included in Table II were selected as accurate representatives of test results received from all states. Varieties are rated in order of excellence.



TABLE III. Turf Quality\*

	1965	1965	1965
Fylking	1	1	2
Merion	1	3	1
Newport		5	3
Windsor		4	
Prato	1		
K 5 (47)	1	2	
Common Ky	2	6	4
	Minn.	N. Jersey	Wash.

\*States included in Table III were selected as accurate representatives of test results received from all states. Varieties are rated in order of excellence.

ly critical evaluation of the variety. The consensus of all these tests was that Fylking possessed a number of superior and desirable turfgrass characteristics as indicated in Table III.

Under sod growing conditions, Fylking produces an unusually vigorous rhizome system with a uniform turf of luxuriant appearance. In 1964 and 1965 North American turf trials, Fylking rated high in competition with other varieties as indicated in Table IV.

It is considerably faster than other Kentucky bluegrass varieties in sod establishment. Because of its rapid rhizome production and superior sod density, a thatch build-up can occur unless there is proper maintenance. A thatch control program is recommended one year after estab-

lishment if the turf has received proper feeding and water application during its first year.

A limited quantity of 0217 brand, Fylking Kentucky bluegrass is commercially available in the United States and Canada. The extensive 0217 testing program will continue on an expanded scale, however, so as to provide a complete history of test results and evaluations to fully document the need and desirability for Fylking's introduction into the turf industry's variety pool. Certainly, on the basis of the extensive, critical testing of the last ten years, it can be said that 0217 brand, Fylking Kentucky bluegrass has most, if not all, the major characteristics desired in a turf, whether it be a golf tee, greens apron, closely mowed fairway, or home lawn.

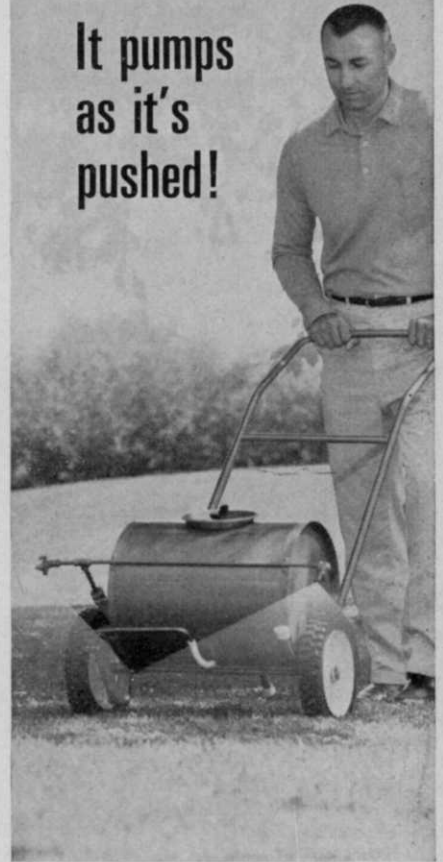
TABLE IV. Turf Density\*

	1964	1965	1964	1965	1964	1965	1964	1965	1964	1965	1964	1965
Fylking	1	1	1	1	2	5	1	1	1	1	1	1
Fylking/Fescue						1						
Merion	2	3	1	1	1	4	2	2	1	1	1	1
Merion/Fescue						2						
Windsor	3	5	3			6	3	3			3	
Windsor/Fescue						3						
Newport	4	4			3	10	3	3				
Newport/Fescue						7						
Common Ky	5		4		3	11	4	4				
K 5 (47)		2		2								
Park			3	3	9					2		
Park/Fescue						8						
	N. Jersey	Minn.	Conn.	Wash.	Ill.	N. York						

\*States included in Table IV were selected as accurate representatives of test results received from all states. Varieties are rated in order of excellence.

# UNIVERSAL Wheel Pump SPRAYER

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as it's  
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## For Turf Care!

One of the handiest sprayers a professional can own. Ideal for jobs too small or too irregular for power equipment. Sprays either a 48" wide or 24" wide swath. Unique rubber wheel-pump "milks" out solution as you push the sprayer. Lays down a heavy residual spray. For killing weeds. Fungus control. Insect control. Turf grubs. Fertilizes, too. Safe. Sure.

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## Meeting Dates



- National Plant Food Institute, Annual Convention**, The Greenbrier, White Sulphur Springs, W. Va., June 11-14.
- The Hyacinth Control Society, Annual Meeting**, Holiday Inn, Fort Myers, Fla., June 18-21.
- American Society of Landscape Architects, Annual Conference**, Hotel Regency, Atlanta, Ga., June 25-28.
- American Association of Nurserymen, Annual Convention**, Americana Hotel, Bal Harbour, Fla., July 8-13.
- National Fertilizer Solutions Association, Liquid Fertilizer Round-Up**, Sheraton-Jefferson Hotel, St. Louis, Mo., July 11-12.
- Third National Grassland Field Day and Conference**, University of Nebraska, Mead, July 12-14.
- Southwestern Fertilizer Conference and Grade Hearing, Annual Meeting**, Skirvin Hotel, Oklahoma City, Okla., July 19-21.
- USDA Turfgrass Field Day**, Plant Industry Station, Beltsville, Md., Aug. 3.
- Miss Lark Trade Show and Convention**, Convention Auditorium, Hot Springs, Ark., Aug. 10-12.
- Penn State 1967 Field Day**, Pennsylvania State University, University Park, Aug. 16-17.
- Nursery and Garden Supply Show**, Texas Association of Nurserymen Annual Convention, City Auditorium, Austin, Aug. 20-23.
- International Shade Tree Conference, 43rd Annual Convention**, Marriott Motor Hotel, Philadelphia, Pa., Aug. 27-31.
- American Society for Horticultural Science, Annual Meeting**, Texas A. & M. University, College Station, Aug. 27-Sept. 1.
- Annual Turfgrass Short Course, Ala-Northwest Florida Turfgrass Association**, Auburn University, Auburn, Ala., Sept. 7-8.
- Pacific Northwest Spraymen's Association, Annual Conference**, Seattle Center, Seattle, Wash., Sept. 15-16.
- Northwest Turfgrass Conference, Annual Meeting**, Harrison Hot Springs, British Columbia, Sept. 19-21.
- National Agricultural Chemicals Association, Annual Meeting**, Holiday Inn, Palm Springs, Calif., Nov. 5-8.
- American Society of Agronomy, Annual Meeting**, Sheraton-Park and Shoreham Hotels, Washington, D. C., Nov. 5-10.
- Texas Fertilizer Association's 1967 Agricultural Exposition**, KoKo Inn, Lubbock, Nov. 9-10.

## Rocky Mountain Producers Form Sod Association

A group of Colorado sod producers has recently organized the Rocky Mountain Sod Growers Association. Headquarters for the new group is at Denver, Colo.

Elected as officers of the new group are: president, J. R. Wilkins, vice-president of Green Valley Turf Co., Littleton; vice-president, Mel Rich, head of Richlawn Turf Farms, Inc., Littleton; and secretary-treasurer, Don Ida of the Green Spot, Littleton.

Board members are: Frank Stewart, Turfgrass Associates, Inc., Platteville; A. A. Hanson, Fountain Valley Seed Co., Fountain; and Marvin Hayes, Northern Colorado Seed Co., Boulder.

Goal of the organization is to acquaint the consumer on use of commercial sod for new lawns. Currently, Wilkins reports, the industry is approaching \$2 million yearly in sales in the state.

## Missouri Turf Group Begins Second Year

A Missouri turf group made up of sod producers and members of the industry is seeking to expand membership as it begins its second year. Missouri Valley Turfgrass Association, Inc., incorporated as a nonprofit organization with a charter membership of 82 last year.

An early objective of the group was encouraging and assisting in turf research. Primarily, the Association began working with the University of Missouri agricultural division. Research most needed according to a poll of members at the 7th Missouri Turf Conference at Columbia, Mo., last year was an evaluation of turfgrass varieties, turfgrass breeding, disease control studies, fertility studies, management studies, herbicide research, and cooperative research with the Missouri Highway Department.

Results as reported by Secretary-Treasurer Earl M. Page, Milorganite distributor at St. Louis, are encouraging. The University of Missouri's Department



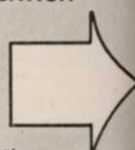
## THE KEY TO EFFECTIVE BRUSH CONTROL

Amchem, originators of 2,4-D, 2,4,5-T and amino triazole weed and brush killers, present in this magazine a series of four single page advertisements outlining the keys, or most effective ways, of obtaining economical brush control.

This "key" series will include the following topics:

1. CONTROL OF MIXED BRUSH
2. AERIAL APPLICATION
3. STEM FOLIAGE APPLICATION
4. DORMANT APPLICATION

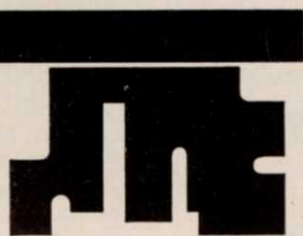
## CUT OUT AND SAVE FOR REFERENCE



Be sure to watch for the entire series. Advertisements are scheduled for March, April, June and September.

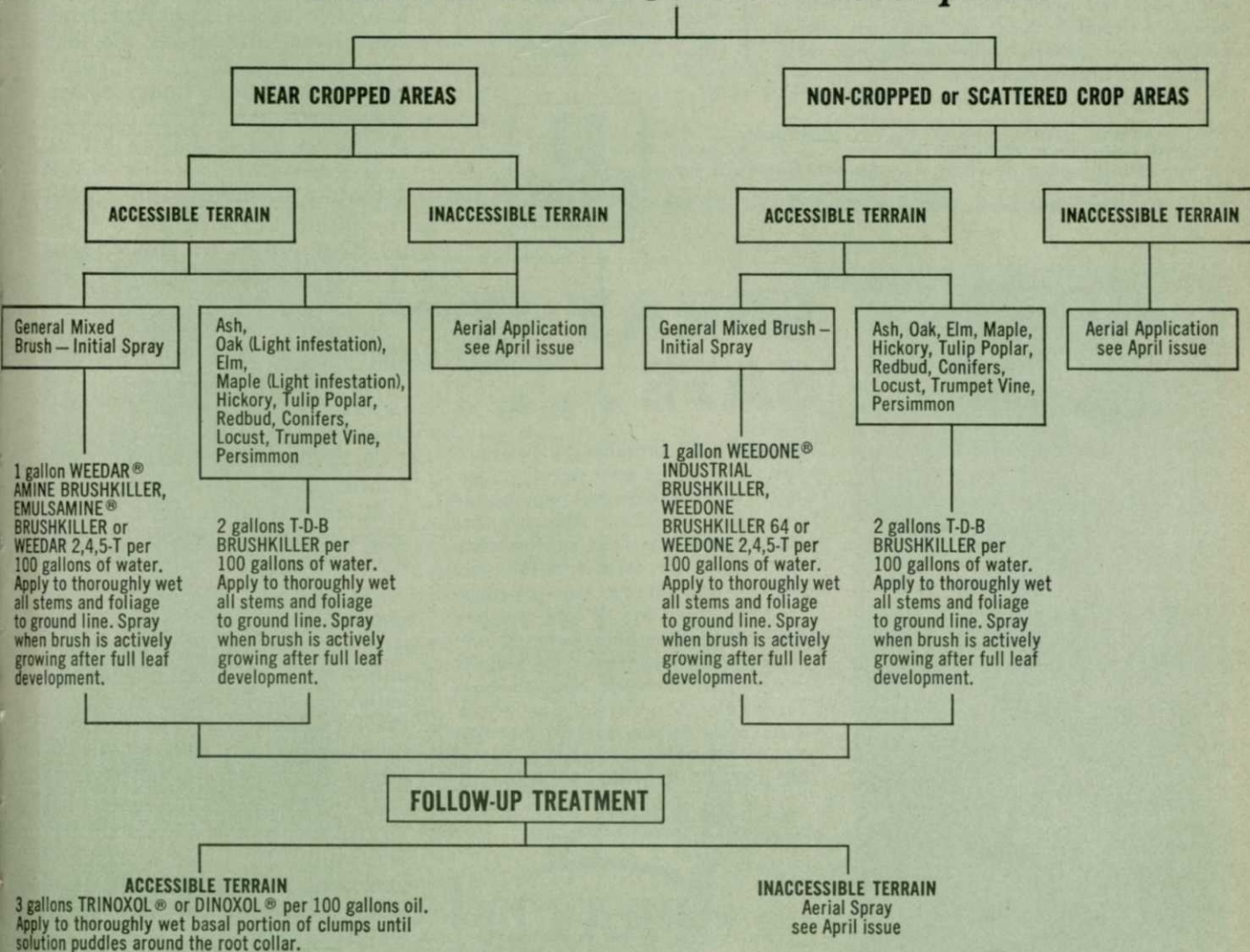
PART THREE OF A FOUR-PART SERIES  
No. 1 (Control of Mixed Brush).  
No. 2 (Aerial Application)  
available on request.





# THE KEY TO STEM FOLIAGE APPLICATION

## *Chemical Brush Control Prescriptions*



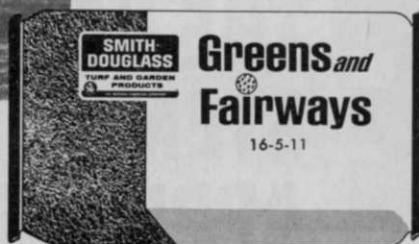
First name in herbicide research  
**AMCHEM PRODUCTS, INC.**  
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## New Greens & Fairways

16-5-11  
FOR TURF



New Greens & Fairways 16-5-11 Turf Food delivers the deep green color, the even, healthy turf desired by golf course superintendents. Formulated especially for institutional use.

The extra nitrogen puts green-up energy into tired turf. Phosphorus and potash in plentiful amounts produce thick, uniform turf with a healthy root system. Free-flowing for easy spreading. Easy-to-use 50-lb. bags.



Save on spreading costs with the NUTRO spreader. Covers 10,000 square feet in 10 minutes.

For prices and name of nearest NUTRO distributor, write Smith-Douglas Division, The Borden Chemical Co., 5100 Virginia Beach Blvd., Box 419, Norfolk, Va. 23501



## SPRAY IT SAFE . . .

Specify PRATT products to give your trees the level of pest-proofing protection and horticultural health that their value warrants. Arborists and custom sprayers—the professionals who have to be certain of the right results—depend on the complete, premium quality line of safe and sure PRATT dormant and summer oils, emulsifiable concentrates for hydraulic and mist blowers, and oil base concentrates for thermal fog equipment. Send for the circular that tells you why—and how: "PRATT'S SHADE TREE SPRAY BULLETIN." It's free.

Distributors of Bidrin®, a product of Shell Chemical Company.



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Phone 201 684-4797

of Horticulture has proposed a 5-year turfgrass research program. A site has been established at the University's South Farms experiment test unit for turf research which will include a reservoir for irrigation. A new staff member at the associate professor level has been authorized to spend full time on turf.

President of the organization, William M. Latta, Princeton Turf Farms, Inc., Kansas City, says that the turf industry in the area is expanding at a rate undreamed of 10 years ago.

### Southern Shade Tree Conference Meets

Conservation is closely associated with trees. Current practices are to emphasize landscaped parking areas, develop vacant lots into small parks, place utility lines underground, sponsor outdoor education classes in parks, and to set up self-guided tours. So stated Jesse A. Reynolds, director of recreation and parks for the city of Richmond, at the recent Southern Shade Tree Conference.

Reynolds commented on the Outdoor Recreation Resources Commission's conclusion that outdoor recreation would double by 1976 and triple by the year 2000. Reynolds believes that both public and private agencies will need to expand the scope of their operations to meet this demand for esthetic outdoor areas.

Clarke W. Davis, executive secretary of the National Arborists Association, in discussing automation said that he did not believe it would greatly affect the tree business. Nevertheless, he feels that arborists cannot afford to overlook new technological developments.

Officers for the new year are: president, Dr. Thomas F. Cannon, department of Horticultural Science, North Carolina State University, Raleigh, N. C.; vice-president, Orville C. Graves, Farrens Tree Surgeons, 1490 Bugle Lane, Clearwater, Fla.; and secretary-treasurer, Francis W. Orrock, Fredericksburg, Va.



## Classifieds

When answering ads where box number only is given, please address as follows: Box number, c/o Weeds Trees and Turf, 1900 Euclid Avenue, Cleveland, Ohio 44115.

Rates: "Position Wanted" 5c per word, minimum \$2.00. All other classifications, 10c per word, minimum \$2.00. All classified ads must be received by Publisher the 10th of the month preceding publication date and be accompanied by cash or money order covering full payment.

### HELP WANTED

**LANDSCAPE ARCHITECT.** Degree in Landscape Architecture from accredited college. Recent graduate considered; several years' experience desirable, not required. Salary open. Fringe benefits. Full-time permanent position. Challenging creative opportunity for sole Landscape Architect on staff. Involves land development; drainage and road plans, landscape and turf planning and management; design, platting, and construction of religious shrine features and structures, and marker and memorial burial areas; preparation of sketches, detailed drafting, working drawings and specifications; use of transit in fieldwork for surveying to establish locations of lots and burial areas; selection and detailing of plant materials; landscape maintenance programming and instruction. Substantial permanent organization, adequate cooperative staff and workers, ten St. Louis metropolitan area cemeteries, more than 1,000 acres. Opening formerly filled

by B.L.A. graduate in this position 14 years. Send résumé and minimum salary requirement in confidence to: Administrator, The Catholic Cemeteries of St. Louis, 7301 Watson Road, St. Louis, Missouri 63119. (Telephone: Area Code 314, FLanders 2-0525.)

**SALES REPRESENTATIVE.** National arborist company needs man with experience or education in tree care or allied field to sell service in Philadelphia area. Salary plus commissions. Excellent opportunity for sales-minded arborist. Send complete résumé to Box 26, Weeds Trees and Turf magazine.

### FOR SALE

**LARGE-SIZED FINN HYDROSEEDER** for highway erosion work. Reasonably priced. Can be seen at 2551 W. 63rd St., Downers Grove, Ill. Phone 968-7706.

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### Bean Highway Sprayer Has New Self-Priming Pump

First two-stage, self-priming centrifugal pump on the market is available in its new 1,000 gal. highway sprayer, John Bean claims.

A skid-mounted sprayer, it is designed for highway and park departments, and permits use of

large nozzles, hose, and guns. High-pressure range of pump, which features stainless steel shaft and enclosed impeller, is 100 g.p.m. at up to 200 p.s.i.

More information can be obtained from John Bean Division, Box 9490, Lansing, Mich.



### Reprinted to Meet Demand

*Weeds Trees and Turf's* widely hailed series of articles on aquatic weed control covers species identification, chemicals for control, methods and equipment for application. Now available in a single 16-page illustrated reprint for handy reference!

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#### WEEDS TREES AND TURF

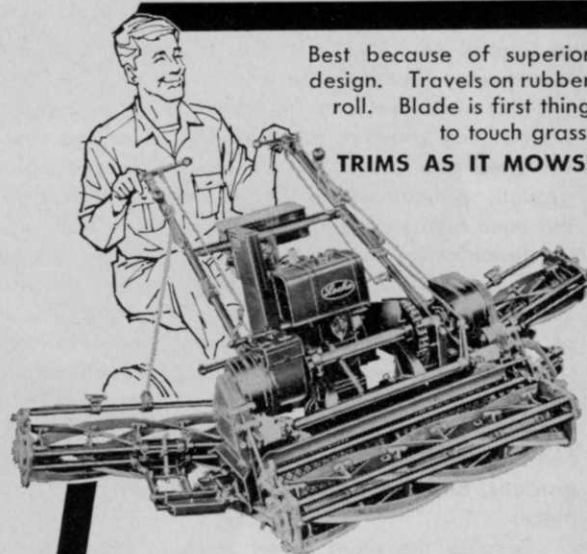
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## FIELD SANDBUR

(*Cenchrus pauciflorus*)



Field sandbur is known by a number of common names such as mat sandbur, burgrass, beargrass, and hedgehoggrass. It is native to North America and widespread from the northeastern U.S. to Central America. It is most troublesome in southern states and infrequently found on the west coast.

This weed pest is an annual which grows 6 to 24 inches in height (1). It may grow as a spreading plant but usually is somewhat flattened and prostrate, forming a semidecumbent mat upon the ground. Animals will graze the plant when it is young and tender; but once heads develop, it is annoying to both man and animal as the terminal spikes of burs readily puncture the skin. Leaf blades which are 2 to 5 inches long are smooth and flat, attached to a sheath with hairy margins which often partially enclose a cluster of burs. Each head contains many burs which are covered with sharp, hook-tipped spines. Each single straw-colored bur (2) contains 1 to 3 small seeds (3).

Field sandbur normally grows from July through September and can be found in waste areas, cultivated fields and pastures, lawns, gardens, and along roadsides. It grows particularly well in sandy places.

Because the plant grows close to the ground, mowing is not effective for control. Cultivation before seed formation, however, will control the plant for the season. Chemical control is possible with arsonate herbicides at 3 to 5 pounds per acre while plants are vegetative. Preemergence treatment with 2,4-D at rates of 2 pounds per acre may sometimes give good control. TCA is also effective as a preemergence treatment. Dalapon can be used as a post-emergence treatment but these latter treatments may also injure the desirable grass species.

Prepared in cooperation with Crops Research Division, Agricultural Research Service, United States Department of Agriculture, Beltsville, Maryland.

(DRAWING FROM NORTH CENTRAL REGIONAL PUBLICATION NO. 36, USDA EXTENSION SERVICE)

## Trimmings

**Try Kentucky Windage.** If you can't soil test, fertilize by eye rather than by formula. Your good sense of observation will serve better than a formula. That's the thinking of Dr. Richard Davis, Agronomist at the Ohio Agricultural Research and Development Center. He points out that too many variable factors influence fertilizer application rate. Soil type, species and variety of grass, removal of clippings, soil moisture, and use of the area are variables which he says affect workability of a simple formula.

\* \* \*

**Railroaders Rely On Chemicals.** Way back, before 1920, hand labor kept railway rights-of-way free of weeds and brush. Since, however, chemicals have been used more and more. Today, railroads are spending \$30 million yearly in weed and brush control, most for chemicals.

\* \* \*

**So Much Is Bull.** It's the time of year again when so many spend so much for organic fertilizers, which admittedly are packaged beautifully and which admittedly have some value. But animal fertilizers in terms of actual value can run \$50 for every 1000 square feet of lawn, if enough nitrogen to do the job is put on via this method. By contrast, about \$4 will buy equal value in commercial chemical fertilizer. Further, the grass can't tell the difference.

\* \* \*

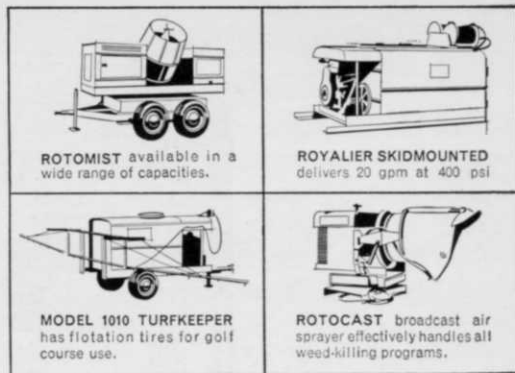
**Made-for-Colorado Fertilizers.** Three specialists in the industry have formed their own firm known as Lawn Specialists Co., at Denver, Colo. They package and distribute made-for-Colorado lawn products, basing their thesis on the need for specific products to fit Colorado turf. Dale Langford, county agricultural agent, Gary Bryant, lawn and garden product representative, and Dean Schiemann, graduate horticulturist, pooled their experience and came up with a unique sales and service organization which can only help the industry. They point out that most nationally distributed products are designed for markets where both climate and soil differ from that of Colorado.

\* \* \*

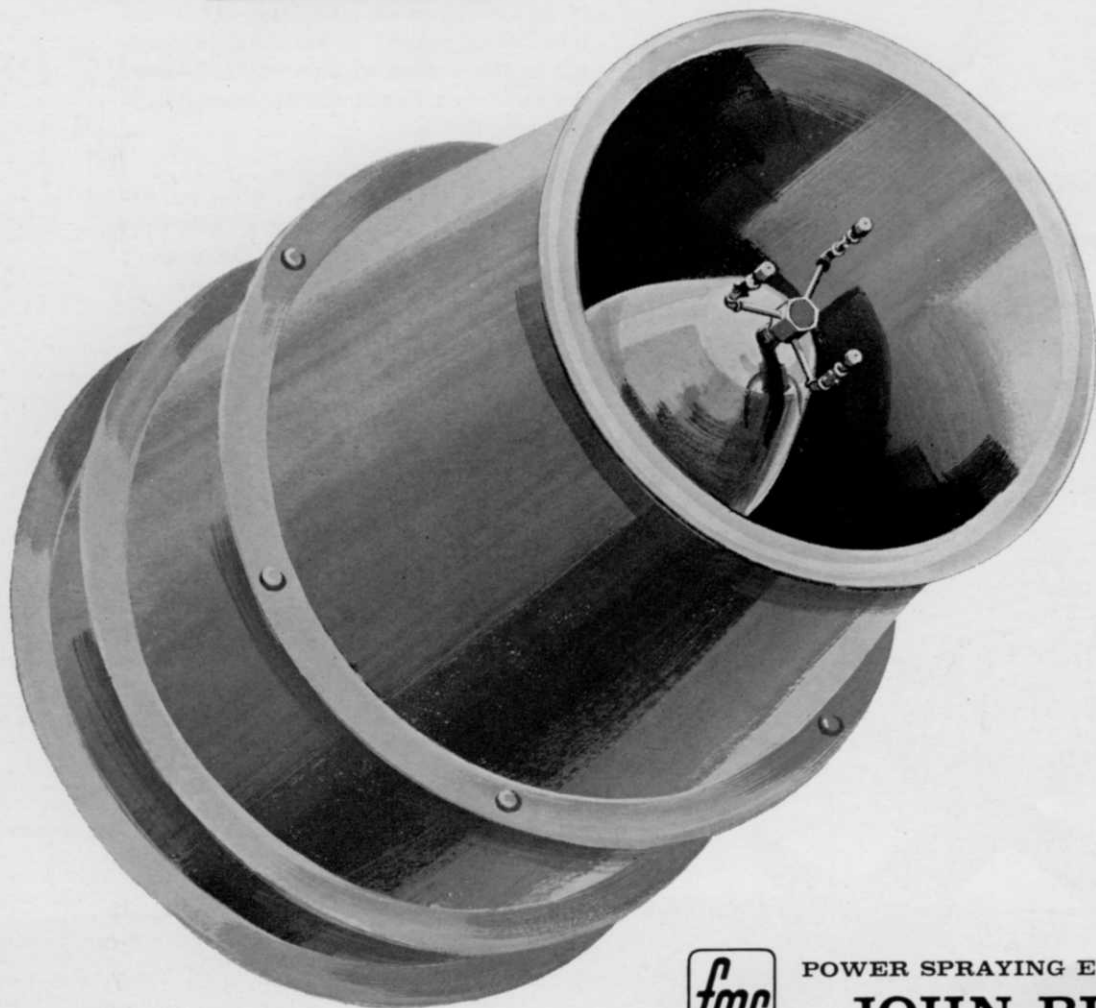
**Picture Worth 1000 Words.** Both Senate and House Interior Appropriations subcommittees recently received a picture showing a sign advertising such young trees as potted evergreens, red cedar, blue spruce and ponderosa pine for sale at 25¢ each from a Wyoming government nursery. Vice President Robert F. Lederer of the American Association of Nurserymen, who made the picture available to Congress, reports that a neighboring private nursery at the same time was selling similar trees at \$1.50. His point that government nurseries can't produce trees any cheaper than private concerns can be well taken. Nor can private operators long afford to pay taxes to finance government grown trees and then compete with government selling prices which are less than 20% of the fair market value.



This Rotomist® sprayer has the greatest "rate-of-work" capacity ever developed for shade tree work. It is a design that provides a *controlled air pattern*, all the way to the top of the tallest trees. This means adequate coverage, as well as more efficient use of your chemicals. It means versatility, because the Rotomist pivots 110° vertically, rotates through 360° horizontally. Which means you can put your spray material—either dilute or concentrate—anywhere you want it. Up in trees. Over an embankment. Down, to windrow leaves. And, of course, John Bean makes many Rotomist models to match your requirements. They all mean business.



# The Business end, In every way!

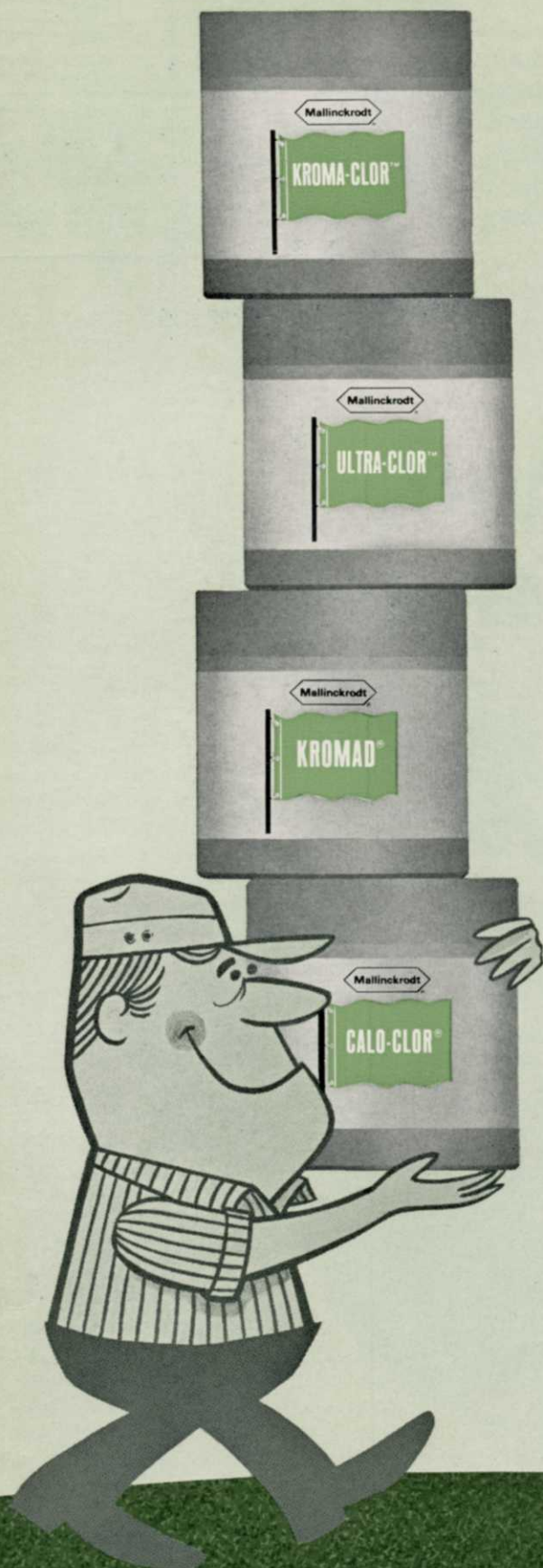


POWER SPRAYING EQUIPMENT

**JOHN BEAN**

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Lansing, Mich. - Orlando, Fla. - San Jose, Calif.



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Here are your three best programs for control of *all* major summer turf diseases. Just pick one—any one—and start spraying now!

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