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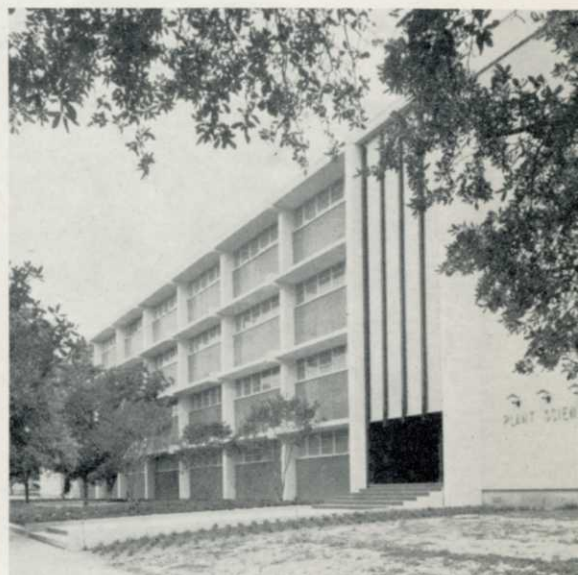
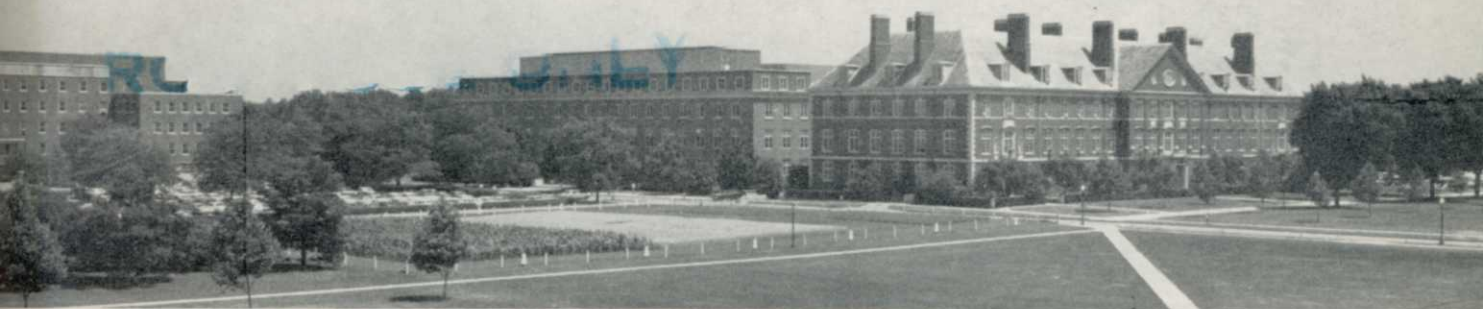
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# WEEDS TREES and TURF

A TRADE MAGAZINES PUBLICATION

February 1967

## Turfgrass Culture: An Urban Agricultural Phenomenon

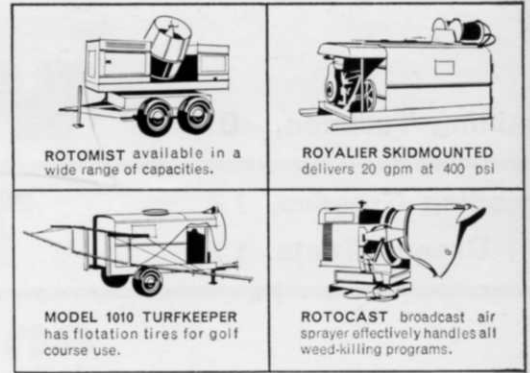


Top: Part of University of Illinois' Agriculture Campus. Lower left: Michigan State's Turf Field Plots. Right: Texas A&M's Plant Science Building.

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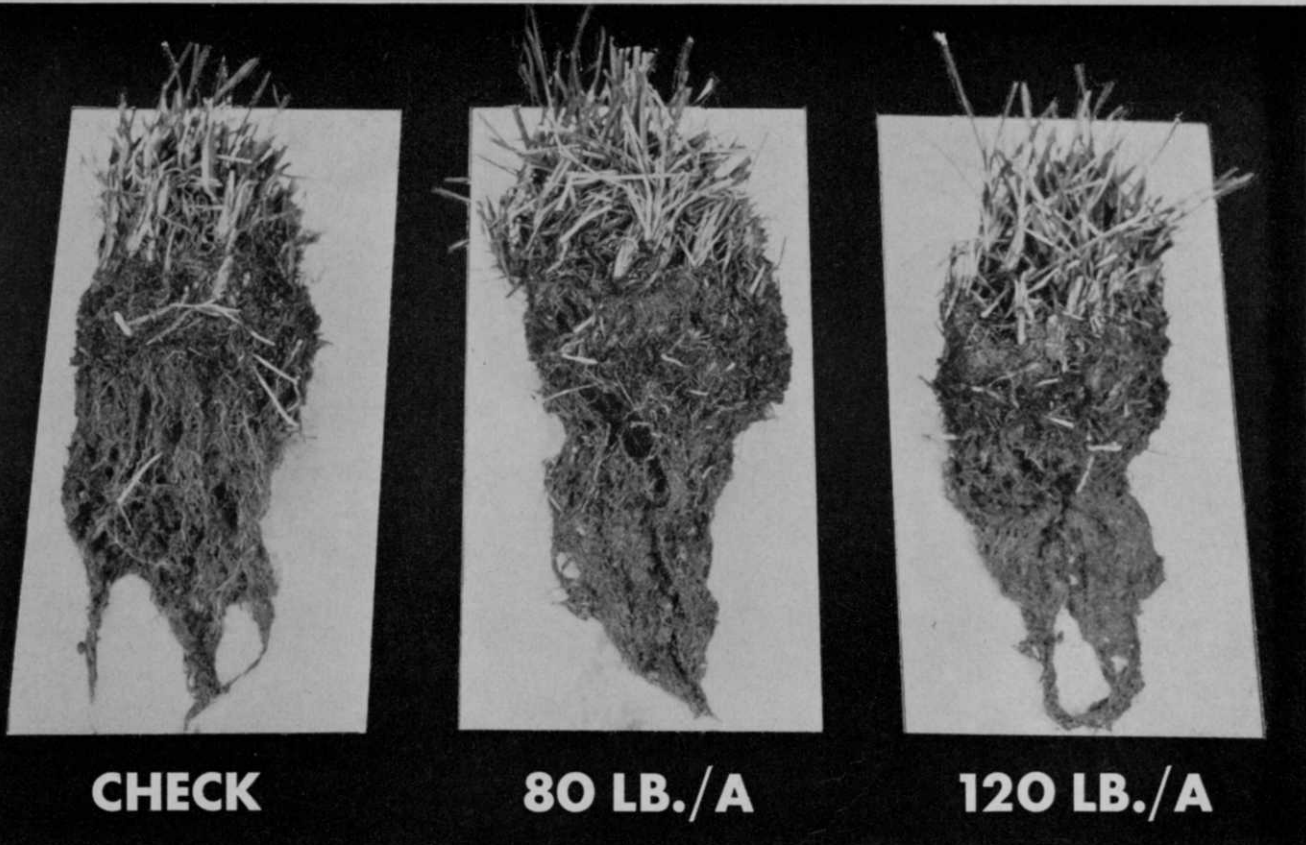


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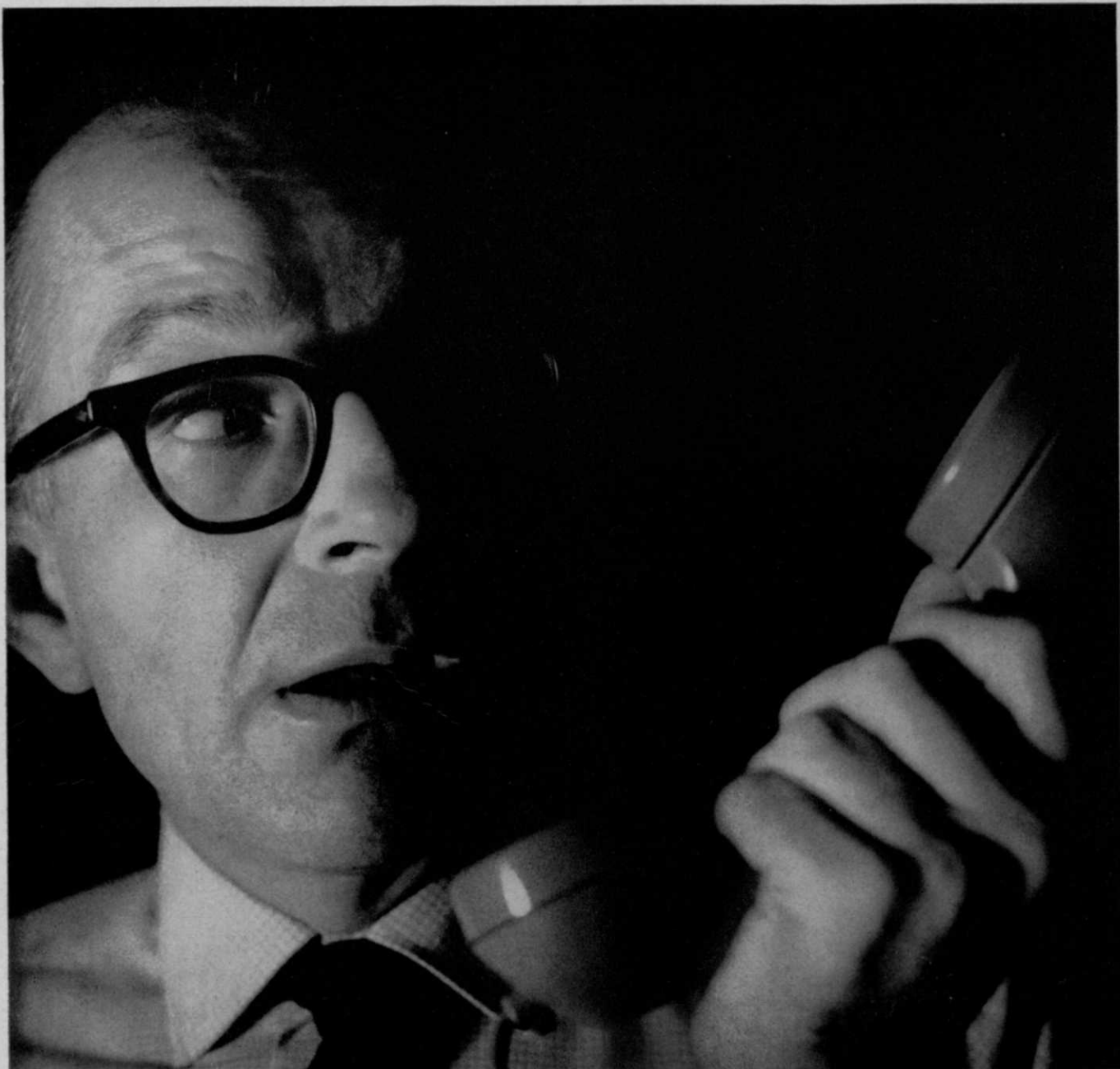
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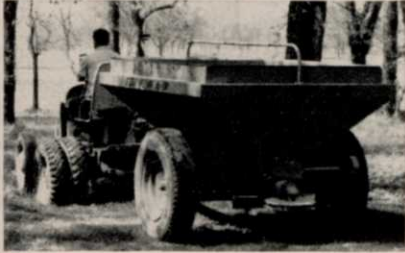
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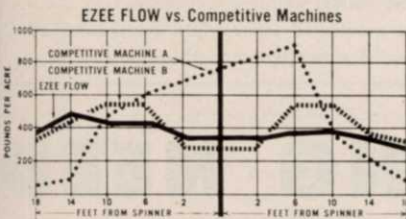
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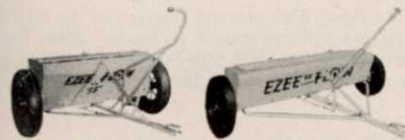
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FORMERLY WEEDS AND TURF

February 1967  
 Volume 6, No. 2

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## WTT Joins Home State Network

As subtle as it may appear to be, there's a big behind-the-scenes change in this issue of WTT. You might call it a case of disappearing Inc. As a matter of fact, Trade Magazines, publisher of WTT, is now a division of Home State Farm Publications, a Cleveland-based publisher of leading farm magazines in five states, having a combined circulation of over 500,000.

Announced January 10, the acquisition makes WTT the junior partner, in terms of age, in the network of seven magazines. Home State's publications were all founded between 1843 and 1862, and our companion publication, *Pest Control*, was begun in 1933. This, we believe, is as it should be.

Dr. J. A. Long, Director of Biochemical Research for O. M. Scott & Sons Co., points out in this issue (page 12) that much of the current interest in turfgrasses is of very recent origin. It's only been about 20 years since agriculture began to move into urban environments.

We think of the swiftly growing interest in turfgrass culture as an urban agricultural phenomenon. And this is equally true of other areas covered by WTT: noncropland weed control, industrial spraying, tree service, landscape maintenance, sod production. All are relatively junior partners in an urban phenomenon with an almost unlimited potential for future growth. And we intend to grow and expand with the industry.

We should emphasize that our joining the larger network will not alter WTT's editorial policies or the scope of our coverage. By permitting our Inc. to disappear in favor of Div., we are deepening our grassroots in the field of vegetation maintenance and control. We're looking forward to greater contact and expanded service to our readers.

We think this is only the beginning of a new era of growth for the urban/industrial vegetation industry and for those who serve it. To expand along with the industry, we'll need the services and backing of a larger organization with offices throughout the country. Now we have it. But Home State Publications offers more than this; our new parent organization has stature and a reputation that makes us proud—pardonably we hope—to join them as their urban/industrial arm. (See photo, page 46).

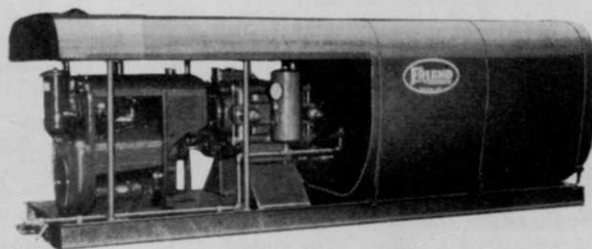
WEEDS TREES AND TURF is the national monthly magazine of urban/industrial vegetation maintenance, including turf management, weed and brush control, and tree care. Readers include "contract applicators," arborists, nurserymen, and supervisory personnel with highway departments, railways, utilities, golf 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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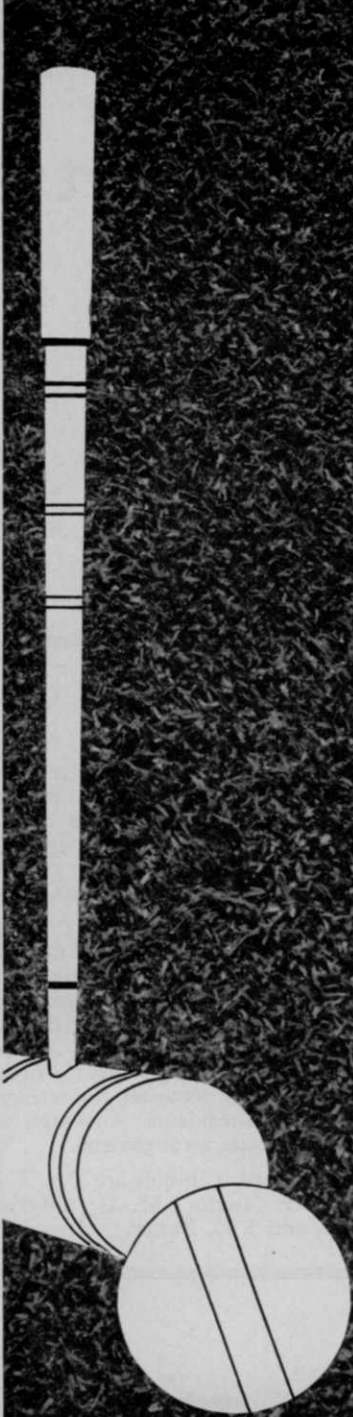


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## Survey '67:

# Turfgrass Management Training, Part 1

*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.*

### University of Illinois, Urbana, Illinois



**Dr. J. D. Butler:** In the past few years we have added turf study to our curriculum and have begun giving it major emphasis.

**Turf training** at the University of Illinois is a cooperative effort between the Departments of Horticulture, Plant Pathology, and Agronomy. Under the direction of J. D. Butler, Assistant Professor in Turf Management, Illinois' program offers a six-week Winter Short Course, with a certificate given, and a four-year undergraduate course leading to a B.S. in ornamental horticulture, turf management major.

**Undergraduate study** has evolved over a 10-year period, while graduate study began about five years ago. Planned for 1968 is an advance six-week short course to update trained turfmen in latest developments.

**Short Course** enrollment is about 18, with high school graduation required and

work in the turf field preferred. In 1967, the course began Jan. 30 and runs until Mar. 10. Information on future courses can be obtained from the Director of Short Courses, College of Agriculture. Course tuition is \$35 for Illinois residents and \$140 for nonresidents.

**Undergraduate students** in turf management currently number 10. Admission is possible several times during the year, and requests for information should be directed to the Registrar, University of Illinois. Tuition and fees for the four-year program amount to \$135 per semester for residents and \$425 for nonresidents. Graduate admission is by special arrangement.

**Turf instructors** at Illinois are Drs. T. K. Hodges, D. P. Taylor, M. C. Shurtleff, F. W. Slife, and J. D. Butler.

### Iowa State University, Ames, Iowa



**Dr. Eliot C. Roberts:** Opportunities for turf graduates are excellent. We are able to fill only 25% of openings referred to us.

**Iowa State's** turf training program is jointly sponsored by the Departments of Agronomy and Horticulture. Students majoring in either department can elect this specialty. The four-year program grants a B.S. in agronomy or horticulture with turf management as a Specialized Training Option requiring 14 credits. Though undergraduate study is emphasized, work towards M.S. and Ph.D. degrees is also offered.

**Dr. Eliot C. Roberts** is in charge of the program, and is assisted in teaching by graduate students and by Professor A. E. Cott, Extension Turfgrass Specialist. Courses in agronomy and horticulture are taught by staffers in these subject areas. Specialized turf training began at Iowa State in 1959 and has produced 35 grad-

uates with B.S. degrees, seven with M.S. degrees, and now has two candidates completing Ph.D. requirements.

**Undergraduate enrollment** usually varies from 20 to 30 students, with five to eight in each class. Iowa State is on a quarter system; students can enter the course at the start of any quarter: first week in Sept., Nov., Mar., and June. Applications should be made well ahead of anticipated starting dates—two quarters is recommended.

**Requirement** for entering the program is acceptance at the University. Tuition and registration fees for an academic year (three quarters) come to \$345 for Iowa residents and \$930 for nonresidents. Contact Dr. Roberts for general information and the University's Registrar for entrance details.



## University of Maryland, College Park, Maryland



**Dr. Elwyn E. Deal:** Opportunities for turfgrass management graduates are outstanding for all phases of turf work in Maryland.

Two-year and four-year undergraduate programs, as well as graduate study are offered by the University of Maryland. Four-year and graduate programs are administered by the Department of Agronomy; two-year program by the Institute of Applied Agriculture.

**Dr. Elwyn E. Deal** directs Maryland's four-year turf training, which leads to a diploma, and also graduate study towards M.S. and Ph.D. degrees. Newer two-year course, offering a certificate on completion, is directed by George D. Quigley. Maryland's undergraduate turf studies began about 1956, while graduate training was instituted in 1964.

**Two-year training** began in 1965, and currently there are seven sophomores (the first class) and 14 freshmen enrolled. The

Institute of Applied Agriculture, designed to provide technical agricultural training beyond the high school level, also offers programs in Arboriculture and Park Management, and Horticulture and Landscape.

**Dr. Deal** teaches graduates and four-year undergraduates, Douglas T. Hawes (turf management) and Breck Debnam (agricultural engineering) handle teaching of two-year students. Tuition for all Maryland undergrads, including fees, totals \$346 for two semesters to residents. Assistantships for graduate study are available. Entrance to four-year course calls for high school diploma and entrance exams. Diploma and approval of Director are needed by two-year students.

**Address** four-year and graduate inquiries to Dr. Deal, two-year inquiries to George D. Quigley.

## Michigan State University, East Lansing, Michigan



**Dr. James B. Beard:** Trained professional turfmen are in great demand in all management areas with salaries well above average.

Michigan State's Department of Crop Science offers two-year technical training in turf management, four-year undergraduate study, graduate work for M.S. and Ph.D. degrees, and short courses. Dr. James B. Beard directs turf education, with John King coordinating the two-year program.

**Four-year graduates** receive a B.S. majoring in turfgrass management. Students may specialize in the science, business, or general aspects of turf, preparatory to graduate study, sales-oriented careers, or field work. Graduate study has been offered since 1945, four-year study since 1965, and two-year technical training since 1966. Short courses began in 1930.

**Entrance** to two-year program requires a high school diploma and carries tuition

costs of \$118 per quarter for Michigan residents and \$340 for nonresidents. Yearly starting date is Sept. 20. Dr. Harold Ecker can provide additional information on this program, which has a current enrollment of 15.

**High school grades**, rank, and courses taken determine admission to the four-year undergraduate program. Tuition is \$108 per quarter for residents and \$290 for nonresidents. For information on 1967-68 admission, write Dr. Beard. Professor Leyton Nelson is contact man for MSU's short course.

**Turfgrass teaching** responsibilities are shared by Dr. Beard, Dr. Paul E. Rieke, John King, and others in supporting departments.

## Purdue University, Lafayette, Indiana



**Dr. W. H. Daniel:** It is reported that Purdue's graduating turf majors have the highest initial pay of any undergraduate group.

**Dr. William H. Daniel**, Professor in Agronomy, directs turf training at Purdue University, where undergraduate work has been an outgrowth of research and graduate study that dates back to 1943-45. Four-year undergraduates work toward a B.S. in Agriculture with a major in turfgrass management. This program was initiated in 1952 and has graduated more than 50 students.

**Purdue's courses** are designed to prepare students for positions as turf superintendents, sod nurserymen, agricultural salesmen, grounds supervisors, and related lines of work. Undergraduate enrollment currently stands at 20; there were five graduates in last year's class. Turf teaching is done by Dr. Daniel. Graduate enrollment usually numbers four students.

**Entrance requirements** of the University must be met by students in the turf program. Tuition for Indiana residents is \$165 per semester; details are outlined in the catalog, which can be obtained from the Registrar, Purdue University. Early application for enrollment is advised, with Aug. 1 the practical deadline.

**Students** in turf management at Purdue are encouraged to gain experience in turf research and practical field work prior to graduation. Work during at least one school year in the research program and one or two summers spent in some management and maintenance activity are expected of undergraduates.

**Contact** Dr. W. H. Daniel, Turf Specialist, Department of Agronomy, for more information on Purdue's turf program.

## Rutgers University, New Brunswick, New Jersey



**Dr. Ralph W. Engel:** Salaries for turf graduates are very good, commensurate with experience, attitude, ability, and education.

Rutger's four-year undergraduate program leads to a B.S. from the College of Agriculture and Environmental Science. Students follow the plant science curriculum and take their electives in turf management subjects. The program is directed by the Office of Resident Instruction, with Dr. Ralph Engel, Professor of Turf Management, as principal teacher and student advisor.

A short course, consisting of one ten-week program a year for two years, is also offered for professional turfmen, landscapers, and others. This program began in 1960 with other, shorter courses initiated in 1928. A certificate is awarded those completing the ten-week technical program, which is already underway for 1967. Plans for 1968 call for an early

January starting date.

Four-year turf study at Rutgers began some 30 years ago. Current enrollment is eight, with college entrance examination and favorable high school standing required for admission. Yearly tuition is \$400 (\$200 per semester). Rutgers also offers graduate programs in turf management leading to M.S. and Ph.D. degrees.

Undergraduate course of study includes such subjects as soils and their management, land planning and utilization, lawn management and fine turf production, plant breeding, principles of weed control, etc. Numerous staff experts cooperate in teaching turfgrass management students.

Requests for information and admissions can be directed to the Office of Resident Instruction, Rutgers University.

## Texas A & M University, College Station, Texas



**Dr. George G. McBee:** There are unlimited opportunities in this area for graduates who are trained as turfgrass managers.

Turf training at Texas A&M comes under the Soil and Crop Sciences Department of the College of Agriculture. Students can enroll in agronomy or plant and soil science curriculums with a major in turf management. Turf and related courses are then worked into the program, which offers a B.S. on completion.

Directing turfgrass training at Texas A&M is Dr. George G. McBee, Assistant Professor. Initiated more than 20 years ago, the Texas program also offers studies towards M.S. and Ph.D. degrees. Curriculums for advanced studies are individually outlined.

Enrollment in turf is currently eight. The course has produced approximately 25 graduates in the past 10 years, with three graduating in the last class. To enter the

turf program, students are required to meet University entrance requirements and have an interest and desire to work in the turfgrass field. On-the-job training can be, and generally is, included as an undergraduate requirement.

Starting dates in 1967 and 1968 fall in Feb., June, and Sept., and early application is suggested. Requests for general information or admission data can be directed to Dr. McBee or to the University's Registrar. Tuition costs come to \$50 for each full semester, not including fees and other expenses.

Several professors in Texas A&M's Department of Soil and Crop Sciences teach subjects relating to the turf program. Cover photograph shows the Plant Science Building, where much of the turf training is conducted.

## Virginia Polytechnic Institute, Blacksburg, Virginia



**Dr. R. E. Schmidt:** Virginia Tech cannot supply the state demand for trained turf ecologists. It is an opportune and challenging field.

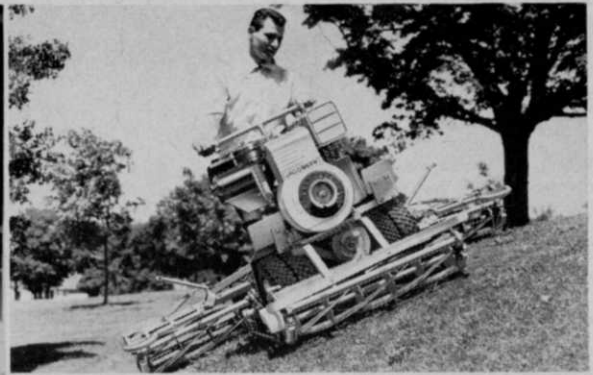
Study options in science (for those anticipating graduate work), technical aspects, and business are offered four-year undergraduate students in Virginia Polytechnic's turfgrass management program. Under the direction of Drs. R. E. Blaser and R. E. Schmidt, Professor and Assistant Professor of Agronomy, the VPI program is conducted within the Department of Agronomy, with the Departments of Plant Pathology and Physiology, and Horticulture cooperating.

Four-year undergraduate and graduate programs are offered, leading to B.S., M.S., and Ph.D. degrees in agronomy with a turf ecology option. Graduate degrees are basically research degrees, and the course of study is selected primarily on student interests.

VPI's turf program was started in the late 1950's, with the first formal course being offered in 1961. There have been about 10 graduates; enrollment now stands at 14. Admission to Virginia Tech. is required for turf study, and students must be high school graduates who have satisfactorily passed college entrance exams.

Starting date for 1967's class is Sept. 13. Applications are accepted any time, but to assure favorable consideration, they should be made six to nine months ahead of anticipated attendance date. Tuition, paid only by nonresidents, is \$140 per quarter. On-the-job training is included as an undergraduate requirement.

Requests for particulars on Virginia Tech.'s program should go to Dr. H. L. Dunton, Head, Department of Agronomy.



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Far right: Worker carries out hybridization on St. augustinegrass plants. In the future, turfmen can look forward to improved, vegetatively-propagated varieties of St. Augustine, the author suggests. Right: Two workers check experimental grasses for seeding characteristics, which will largely determine methods selected to improve the grass. Data on breeding behavior of perennial grasses is not easily obtained, Dr. Long points out.



# Breeding Improved Turfgrasses



ORGANIZED research for breeding improved turfgrasses represents a relatively recent development in the turf industry. Activities of early turf research and development programs were concentrated primarily on fertilization, pest control, and other factors related to maintaining lawn grasses.

With significant progress in developing a wide and effective array of products for maintaining turf, attention now appears to be shifting to the basic ingredient of the landscape plan: the turfgrass itself. Examining the industry approach to turfgrass breeding may give the impression of starting at the wrong end. Should turf research have begun in breeding studies rather than concentrating on other aspects of grass culture?

The answer may in part be related to the growth of the United States. As recently as two decades ago, a large part of U. S. population was concentrated in rural areas and presented a limited economic factor in the turf

By  
**J. A. LONG**

Director, Biochemical Research  
O. M. Scott & Sons Company  
Marysville, Ohio

industry of that period. Also, most of the financial support of public research programs, along with limited private research, was directed to food, animal, and fiber crop categories.

Improved grasses developed in agricultural research programs primarily for forage application have found some turf use. These and nonimproved grasses such as common Kentucky bluegrass, common bermudagrass, red fescue, and St. augustinegrass have provided the major source of turfgrasses. Even today, nonimproved varieties still supply a large part of lawn and turf requirements.

### **Turfgrass Breeding: A Decade of Progress**

Most organized and sustained breeding programs now in progress date back only about a decade. Thus, a point has not

been reached when a significant number of new and improved grasses can be made commercially available. Chief reason for this time delay is the technology gap. Effective plant breeding requires an understanding of the behavior of the plant species to be improved, and data on breeding behavior of perennial grasses is not obtained as quickly on an annual crop species, such as small grains.

Breeding studies investigate such factors as cytological characteristics (chromosome numbers, embryo-sac development) and whether the source material is cross-fertile or self-fertile. Selection of plant breeding methods depends on this data. As of this point, basic research that should provide grounds for new turfgrass developments is well underway.

A number of breeding programs are building up a source of material to work with. U. S. Department of Agriculture's Plant Introduction section provides experimental grasses from world

collections to both public and private plant breeders. Both types of programs actively collect source breeding material and often will concentrate collections from pastures, golf courses, and home lawns. Much of the material collected requires modification before it is usable, but it plays an important part in the search for disease and insect resistance, improved growth habits, adaptation to regional demands, etc.

More recently, agents to increase mutation in grasses and ground covers are being used to supplement breeding programs. Radiation and chemical mutagenics represent this means of generating breeding material.

#### Selection Pressures Imposed on Grasses

"Selection pressure" and "survival of the fittest" are two important concepts guiding plant breeders. Once a program has collected source material, the sorting process begins. This represents the major part of the breeding program in terms of labor requirements, money, and physical facilities, and has undoubtedly limited the extent and number of organizations actively engaged in turfgrass breeding.

Most breeders feel that an improved grass must equal existing commercial varieties in desired qualities and have at least one additional quality characteristic before it will be accepted by the consumer. With this in mind, a program is designed to impose selection pressure on a large



Dr. J. A. Long, Scott's researcher.

population of experimental grasses. Kinds of selection pressure used in typical programs include:

1. Differences in mowing heights with emphasis on low cuts to isolate superior turf formers.
2. Disease and insect infestations at a level sufficient to sort out genetic resistance.
3. Controlled levels of sunlight to find types exhibiting shade tolerance.
4. Regional evaluation to study effects of temperature and its interaction with disease on plant survival.
5. Variations in nutrition level.
6. Tolerances to chemical pest controls.
7. Seed production capabilities of experimentals that are propagated by seed.
8. Establishment rate of experimentals propagated vegetatively.

Some selection pressures can be applied in common test systems, while others require that specific tests be set up. Experi-

mental grasses may show outstanding characteristics under certain selection pressures and important weaknesses under others. For example, a variety may be highly disease resistant, yet a very poor seed producer. When this happens, the experimental selection may be moved back to the initial phase of the breeding program, where hybridization or other means will be attempted to overcome the weakness.

With Kentucky bluegrass and bahiagrass it is very difficult to modify an exceptional selection because of barriers (apomixis) to effective hybridization. Breeders must usually evaluate large, variable populations of these grasses to make significant progress.

Recent research from the Texas Agricultural Experiment Station and USDA relating to inheritance of apomixis should assist breeders working with apomictic grasses. In addition, breeding results from Rutgers University may also increase the effectiveness of Kentucky bluegrass programs.

It often requires from three to five years of subjecting grasses to different selection pressures before sufficient evidence of superior turf characteristics is available to move into advance testing and then to commercial seed or sod production. These stages add from three to five more years to the time required before a new turfgrass candidate reaches the consumer. Total time, then, needed to develop an



Far left: Experimental grasses are checked for reaction to stripe smut inoculations. Subjecting grasses to high levels of disease and insect infestations is one kind of "selection pressure" applied to sort out varietal resistances. Left: Individual experimental selections are harvested by hand to prevent intermixing of seed. Sufficient seed is collected from such plantings to establish test plots for evaluating selections under mowing.



# IMPROVE TURF CARE

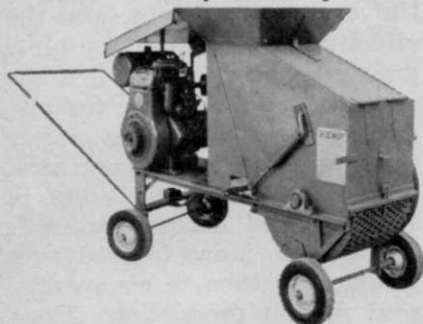
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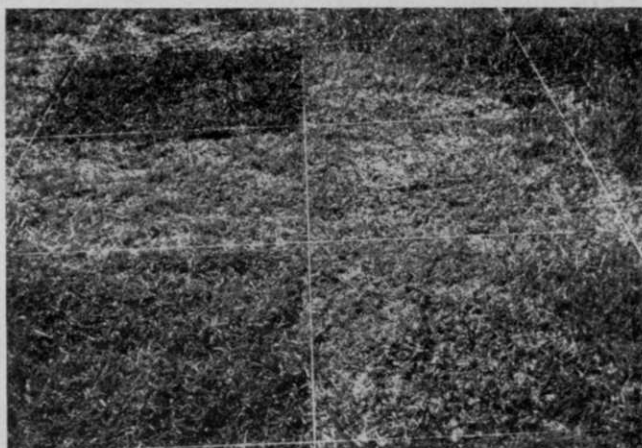
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Plots (right) show experimental selections of St. Augustine installed in turf areas heavily infested with chinch bugs to check susceptibilities to this damaging insect.



improved turfgrass is in the range of 10 to 15 years.

### Looking Ahead to Grass Improvements

Based on current progress of breeding programs in the U. S. and Europe, improvements in some of the following grass characteristics can be anticipated:

1. Lower profile grasses with improved turf forming qualities that should perform better under lower heights of cut.
2. Grasses that are better adapted to specific regional conditions.
3. Increased resistance to leaf spot, smut, and some insects.
4. Improved performance in shade.

Experimental grasses showing some of the above characteristics may have certain limitations, however. Dwarf or low-growing grasses seem to establish a mature turf more slowly than some present varieties. Variation in maximum growth has also been observed. In this respect, certain dwarf types appear to produce more clippings at lower heights ( $\frac{3}{4}$  and 1 in.) than present taller growing varieties. When the height of cut is increased, the dwarf characteristic is shown by a drop in clippings removed compared to today's commercial grasses. This suggests that more attention to mowing height may be required to benefit from improved growth habit.

In the future, new varieties of such warm season grasses as Bermuda and St. Augustine no doubt will be vegetatively propagated as at present. This takes advantage of the greater vigor of F1 hybrids and makes it possible to release improved grasses where it would not be possible

by seed propagation because of high sterility levels.

Increased interest and research activity is being devoted to turfgrass breeding programs. Consumer demands as a result of population shifts from rural to urban areas, plus the rapid increase of industrial and recreational turf applications, provides the basis for this increased activity.

Introduction of improved grasses to consumers will initially be slow due to a lack of technological background on important plant species. A shortage of trained specialists in this field until recently will no doubt influence the number and quality of new grasses developed in the near future.

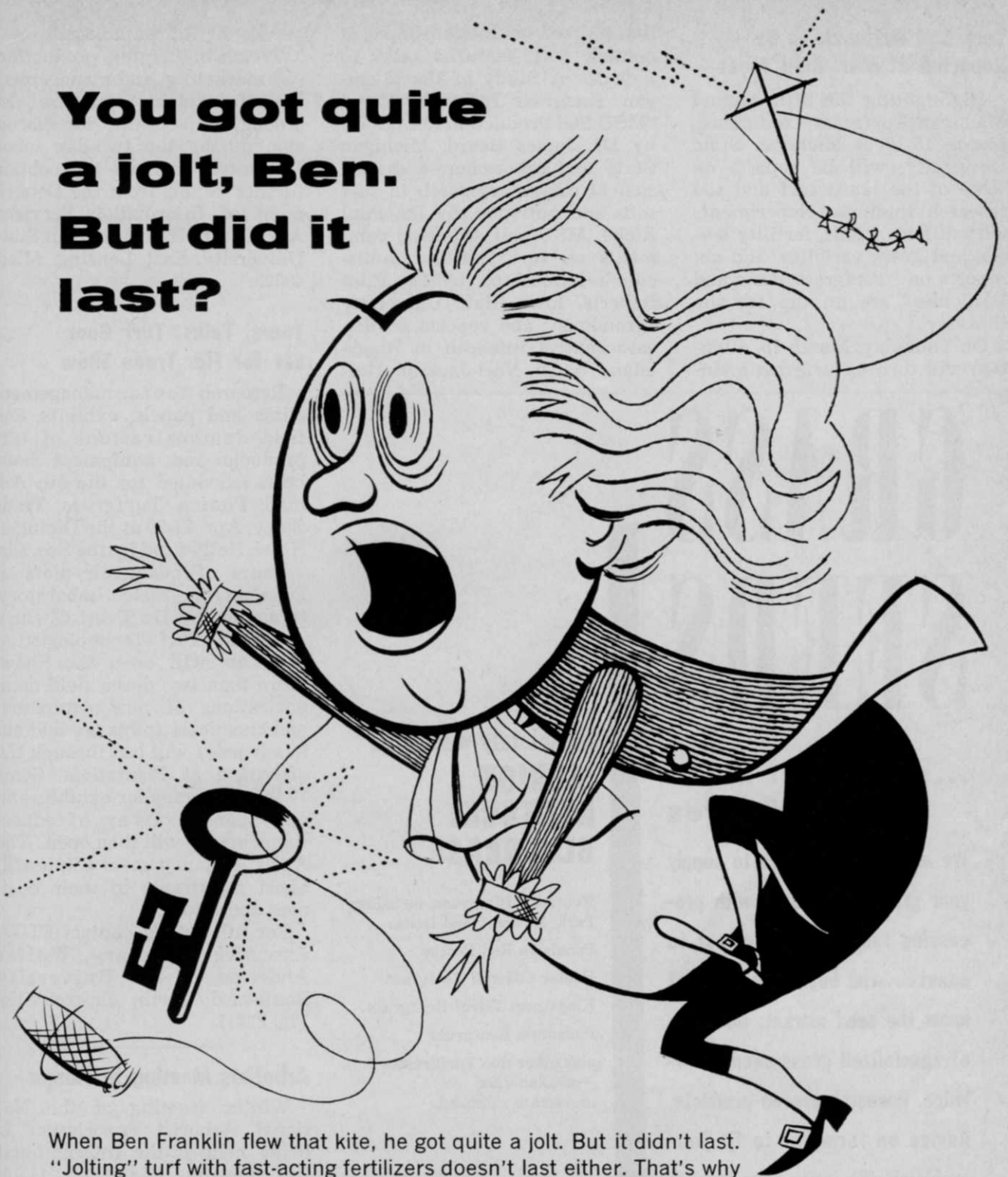
Progress in developing breeding methods and test systems for sorting out potentially desirable turfgrasses is being made by public and private workers. Based on current progress in the field, some degree of improvement in many important turf qualities can be expected in the next decade.

### N. Calif. Turf Day Set

Latest equipment and materials for turf maintenance and landscaping will be exhibited at the 3rd Annual Northern California Turfgrass Exposition, Mar. 22-23 at Strybing Arboretum, San Francisco, Calif.

Turf managers, contractors, and others interested can contact C. R. Staib, co-chairman, for more details. Address: Hercules Incorporated, 120 Montgomery St., San Francisco, Calif.

**You got quite  
a jolt, Ben.  
But did it  
last?**



When Ben Franklin flew that kite, he got quite a jolt. But it didn't last. "Jolting" turf with fast-acting fertilizers doesn't last either. That's why you have to jolt it so often. But Nitroform®, Hercules' ureaform turf food with 38% nitrogen, feeds at the steady rate turfgrass demands, lasts up to five times longer than conventional fertilizers. □ Nitroform is nonburning and odorless. It resists leaching and builds a nitrogen reserve. It's easy to apply, either as granular Blue Chip® for mechanical spreaders or as Powder Blue\* for liquid application. □ Contact your Hercules representative or write: Turf & Horticultural Products, Synthetics Department, Hercules Incorporated, Wilmington, Delaware 19899.

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## Turf, Sod Research To Be Reported at Mar. MSU Meet

Highlighting the 37th Annual Michigan Turfgrass Conference, March 15-16 at Michigan State University, will be reports on some of the latest turf and sod research findings. Experiments with different soils, fertility levels, and grass varieties, and six reports on "Turfgrass Pests and Pesticides" are on tap for the first day.

On Thursday, March 16, attention will turn to turfgrass main-

tenance, sod production, and economics, with featured talks to include "A Study of the Michigan Turfgrass Industry" and "MSU Sod Production Research," by Dr. James Beard, Michigan State turf researcher; a discussion of current research in turf soils and nutrition, by Dr. Paul Rieke, MSU soil scientist; comments on turf fertilization-disease relationships, by Dr. Eliot Roberts, Iowa State University agronomist; and reports on disease control research in Rhode Island, by Dr. Noel Jackson, Uni-

versity of R.I. pathologist.

Trends in turfgrass production, sod marketing, and management tools for cutting costs are also among subjects due for discussion during the two-day meet. Interested turfmen can obtain further details from the Department of Information Services, Agriculture Hall, Michigan State University, East Lansing, Mich. 48823.

## Tours, Talks, Turf Gear Set for Fla. Trade Show

Research tours, management clinic and panels, exhibits, and field demonstrations of turf products and equipment have been scheduled for the 6th Annual Florida Turfgrass Trade Show, Apr. 27-29 at the Diplomat Hotel, Hollywood by the Sea, Fla.

Tours of research plots at Plantation Field Laboratory, conducted by Dr. Evert O. Burt, Associate Turf Technologist at the Lab, will open the Show. More than two dozen field demonstrations of new equipment and chemicals (plots are laid out in advance) will last through the afternoon at Plantation. Some 70 industry supplier exhibits and an expanded array of educational booths will then open. The April 28 Management Clinic will assist registrants in their business operations.

For full details, contact FTGA Executive Secretary, Walter Anderson, at 4065 University Boulevard North, Jacksonville, Fla. 32211.

## Arborists Meeting in Tampa

Winter meeting of the National Arborist Association is being held at the International Inn, Tampa, Fla., Feb. 11-15. Business sessions occupy the first two days of the program, with a round of discussions scheduled for Feb. 13-15.

Arboriculture advances, a look at the future for utility men, and the national beautification effort lead off talks. Management techniques, systemic insecticides, records, and hidden costs are closing considerations of NAA members at this year's annual winter gathering.

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# VPI's Putting Greens Test Modified Soils



By

**R. E. SCHMIDT**

Assistant Professor of Agronomy  
Virginia Polytechnic Institute  
Blacksburg, Virginia

GOLF is attaining greater popularity. National TV viewing, championship play, and more leisure hours have helped it to become the country's number one participating sport. Attesting to this is the National Golf Foundation's estimate that women and junior golfers alone have increased over 40% since 1961. There is even a trend toward night golf under lights on regulation-length courses to accommodate the increased play.

Greens that once were satisfactory now produce poor turf under this increased traffic. Many greens were reconstructed by blending materials with put-

ting green soils to help lessen the compaction of heavy and constant traffic. Modification of soil for putting greens was realized as a necessity quite early. Then, as today, soil modification appeared to be generally a hit-or-miss practice. In 1950, H. B. Musser\* reported a survey showing that most superintendents were using modified soils with volume ratios of 1-1-1 or 2-1-1 of soil, sand, and organic matter. Neither type of soil, sand, or organic matter was identified.

\*Musser, H. B. Turf Management. McGraw-Hill Book Co., Inc., N.Y., 2nd Ed.

Many superintendents have modified soils to match the soil of satisfactory putting greens in their area. This is a good method, provided similar management and traffic is applied. Duplicating soil mixtures from a completely foreign ecological environment may result in unsatisfactory putting greens.

Only recently has any experimental effort been made to evaluate different soil mixtures. A few colleges and universities now have studies underway. In 1964 the Weblite Corporation awarded V.P.I. a grant-in-aid to evaluate their graded expanded shale, Weblite, for turfgrass soil

Table 1. Results obtained after one season of compacted soils modified with various percentages of sand and Weblite.

% vol. mod.	Porosity		Moisture content	Percolation	Wilting resistance	Clipping wts.	Density	Color
	Cap.	Non-cap.						
<b>SAND</b>								
24	high	low	good	fair	good	excellent	excellent	good
41	high	low	fair	fair	good	good	excellent	good
54	adequate	adequate	poor	good	fair	good	excellent	good
68	adequate	adequate	poor	good	poor	fair	fair	fair
86	low	excessive	very poor	excessive	very poor	fair	poor	fair
<b>WEBLITE</b>								
24	high	low	excellent	good	excellent	excellent	excellent	good
41	high	low	good	good	good	excellent	excellent	good
54	adequate	good	good	good	good	excellent	excellent	good
68	adequate	high	poor	excessive	fair	fair	excellent	good

modification. We were looking for a modified soil that would have the following properties:

1. Resistance to compaction.
2. Adequate internal drainage and sufficient aeration after exposure to traffic.
3. Adequate moisture holding capacity.
4. Adequate nutrient holding capacity.
5. Adequate cation exchange capacity.
6. Firm, but resistant surface.
7. Economic feasibility of use.

Weblite is lightweight (bulk density 8.5), holds 15% of its weight in water, and can be uniformly graded so that 98% of the material will fall between the 10 and 60 mesh screens (medium to very coarse sand particle size). This material was evaluated in an experimental green by mixing it with various percentages of a Groseclose silt loam and 5% pinebark. The mixtures were then placed in 10 x 8 foot bins over a gravel and tile system, fumigated and seeded with Penncross bentgrass. Corresponding soil mixtures of a concrete sand with 90% of the particles between the 10 and 60 mesh screens were also incorporated into experimental greens.

A unique golfer with 15 spiked

shoes, three hitting at a time, and weighing 450 pounds was employed in 1965 to compact greens. One trip was equivalent to ten golfers walking on the same surface.

After one season the following was observed:

1. Traffic reduced turf growth and quality on all mixtures.
2. Turf cover and color were satisfactory on all Weblite modified soils, but clippings, moisture capacity, and drought resistance were reduced when more than 54% Weblite was used.
3. On sand modified plots the density and color as well as clippings and wilt resistance were reduced when more than 54% sand was used.
4. Less Weblite than sand was needed to obtain similar results.
5. It appears that modified soils satisfactory for putting greens with heavy traffic should have the following physical properties:
 

Total porosity	40-45%
Capillary porosity	20-25%
Non-capillary porosity	18-22%
Percolation (in. per hour)	1-10

These physical properties are based on one season of field data and must not be considered absolute. Further evaluation is needed because, as workers at Penn State have indicated, after the second season of traffic their modified soils became increasingly compacted compared to the first season.

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with **Dacthal®** herbicide you get pre-emerge control of these weeds and grasses:

Annual bluegrass	Foxtail
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Crabgrass	Stinkgrass
Fall panicum	Texas millet
Florida pussley	Witchgrass

with **Dacamine®** you can kill these weeds once and for all:

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Bitterweed	Pennycress
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Chickweed	Plantain
Chicory	Poor Jo
Croton	Puncture Vine
Dandelion	Ragweed
Dock	Shepherd's Purse
Fan Weed	Spurge
Knotweed	Thistle
Kochia	Wild Carrot
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Mustard . . . and many, many other hard-to-kill weeds.	

with **Daconil 2787™** fungicide you can effectively control these turf disease organisms:

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Curvularia and Helminthosporium leaf spot
Blights—
Going out
Fading out
Melting out

All-out control of weeds and disease, all season long, from one source—Diamond Alkali Company, Agricultural Chemicals Division, 300 Union Commerce Building, Cleveland, Ohio 44115



## Diamond Chemicals



Construction of an experimental putting green at Virginia Polytechnic Institute for evaluating various soil mixtures adaptable to today's heavy golf traffic.



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

# say goodbye to weeds and disease in turf.



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With turf, you could say "it isn't the initial growth, it's the upkeep." That's where Diamond comes in, with products to give you all-out, season-long control of weeds and disease organisms.

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**Dacthal®**—best crabgrass preventer you can buy. Also prevents many other weeds and undesirable grasses. Apply early for excellent pre-emergent control. Use in ornamentals, too!

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## Vertical Mulching Boosts Root Growth

By WAYNE C. MORGAN

**W**HERE do roots grow? Under what environmental conditions are they active? The answers to these questions are of prime importance to persons having responsibility for establishing and maintaining landscape plants. Health and beauty of most plants are usually in proportion to the extent and vigor of the root system.

*Roots do not grow into soil.* They grow in the pore spaces surrounding soil particles. If there are only small pore spaces due to compaction and breakdown of soil structure, the physical barrier of dense soil will restrict root elongation.

Roots do not grow where it is too dry. Neither do they grow where it is too wet. They grow

only where there is a favorable soil-moisture-air relationship. Water penetrates very slowly into and through clay, silt, and compacted soils. With restricted water movement into the deeper rooting zone of such soils, lack of sufficient moisture will not allow root growth. Where water has infiltrated, root activity will be limited because of excess moisture and insufficient oxygen in the dense soil.

Unwise irrigation practices can create conditions unfavorable for plant health. Water applied too fast runs off rather than entering the soil. Shallow rooting is usually the result. Applying more water than needed not only is wasteful, but will severely limit roots from

aiding top growth where poor soil conditions exist.

### **Backfilled Holes Help Restore Vigor**

When faced with poor growing conditions, a method of drilling holes around trees or shrubs and replacing soil with an improved mix will probably help significantly to restore vigor and beauty to plants. Known as "vertical mulching," this method is similar to "deep-root feeding" and "perforated feeding," except that in the latter holes are not backfilled with an improved soil mix.

In vertical mulching, holes from 2 to 3 in. in diameter are drilled into soil beneath the plant's drip line, approximately one per square foot. These can

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- Vigorous rhizome growth produces sod faster than other Kentucky bluegrass varieties!
- Overall turf quality rated "best obtainable" by noted authorities!
- Dense turf with deep, rich green color—even under close cutting, summer heat, drought, and hard usage.
- Proven resistance to stripe smut.
- Resistant to Leafspot, Stem rust, Leaf rust, and Fusarium roseum.
- Adapted to close cutting heights commonly used on tees and aprons of greens. Recommended cutting height, 1/2 to 3/4 inch.

For additional information and names of authorized distributors, write Jacklin Seed Co., Inc., Dishman, Wash., 99213.

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be from 18 to 36 in. or more deep, depending on plant size and possible depth of rooting. Holes should be slanted inwards toward the tree trunk. Do not drill holes within a few feet of large tree trunks, since care must be taken to avoid damage to larger roots.

Holes can be hand drilled with barrel augers, or mechanically drilled with tractor-mounted, generator-powered, or gasoline-powered augers. Some grounds managers use water as a source of power, with threaded pipe attached to a hose.

Fill holes with a soil mix consisting of approximately 60% of the soil at the site, 10% of a partially decomposed humus, 10% peat moss or similar material such as fir bark, and 20% of a long-lasting wood waste.

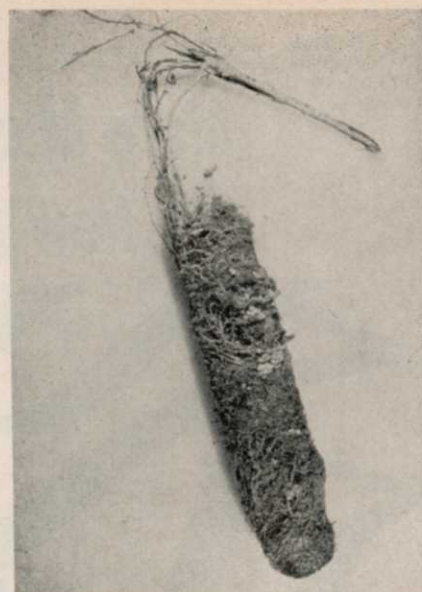
Humus provides conditions favorable to continued activity of soil microorganisms, which help to improve soil structure and nutritional benefits. Peat moss or fir bark is excellent for rooting but cannot withstand compaction.

### Soil Must Be Kept Open to Air, Water

The long-lasting wood waste serves to physically hold the soil open. This permits easier water entry into and through soil and exchange of oxygen and carbon dioxide gases between the atmosphere and soil environment.

It has been suggested that sand or gravel be used to fill the holes. Though it is true that such materials will allow better air and water movement into the soil, the mix suggested here will fulfill the same basic function and also provide a favorable medium for root growth. In such coarse-texture soils as sands and decomposed granite, the soil mix will also add to moisture-holding capacity.

*These holes must be left open to the soil surface.* If they aren't, water movement in the soil may be restricted. Holes must also be within the plant's root area. Roots do not seek favorable air and moisture conditions; they only grow where such an environment exists.



**Dramatic evidence** that vertical mulching boosts root growth. Picture shows roots exhumed from a mulching cavity.

When the great value of landscape trees and shrubs is considered, it is apparent that they deserve the low-cost help vertical mulching can provide when poor soil conditions limit development.

Coming in March: "Can Trees Be Fertilized Economically?" by Drs. Dan Neely and E. B. Himelick. Part of a Special Fertilization Issue.

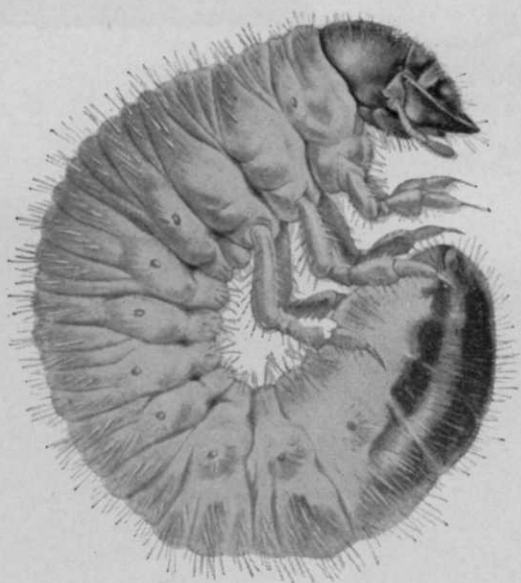
### USDA Tests Show Greater Washoff of 2,4-D Ester

Recent Georgia tests conducted by scientists of the U. S. Department of Agriculture's Agricultural Research Service show that 2,4-D in the ester form is more easily washed from soil than amine formulations.

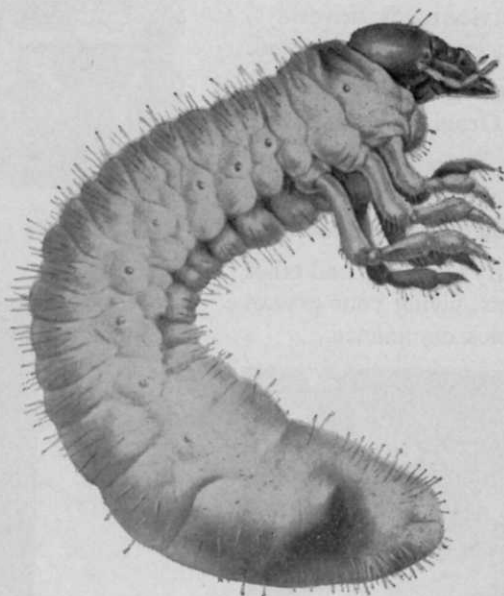
Using simulated rainfall, runoff from test plots was trapped and tested for herbicide content. Results showed that up to 27% of 2,4-D ester was washed off, but only 3% of the amine, indicating a close connection between herbicide form and loss from rainfall.

Lower amine loss was attributed to its much greater water solubility, which enables it to penetrate soil more readily than ester forms. Tests were conducted at experimental plots in Watkinsville, Ga., with cooperation of the Georgia Agricultural Experiment Station.

# Dieldrin stops these root destroyers dead— before they can ruin turf.



White grubs “work” in the soil for 2-3 years—chewing roots, cutting grass off from water and fertilizer in the soil.



Japanese beetle larvae makes grass look sick. Control with dieldrin breaks life cycle, helps keep turf vigorous.

**D**IELDRIN INSECTICIDE controls all species of root-destroying grubs—including Japanese beetle larvae and white grubs (June beetle larvae). Leaves them to rot in the soil—to “feed plants” instead of feeding on them.

Dieldrin gives you long-lasting effectiveness plus a choice of applications. Can be applied any time after the soil warms up.

Dieldrin can be put on in fertilizer, or in granular form. Liquid concentrates and wettable powders are available for spraying or drenching.

Use dieldrin ahead of time to knock out soil insects *before* they can discolor and damage turf. Or use it to stop an infestation.

Control with dieldrin is extremely effective—so thorough that grub-eating moles and rodents

can't find food in the treated area and leave.

Full details for using dieldrin are on the label. For more information write Shell Chemical Company, Agricultural Chemicals Division, 110 West 51st Street, New York, New York 10020.

Always read and follow label directions before using any pesticide.



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Building new service roads, driveways, walks and terraces. Spreading gravel.

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Raking thatch, matted leaves, other debris. Aerating, fertilizing and re-seeding, all in the same operation.

Spraying for early kill of ivy and other broad leaf plants, giving your grasses a chance for quick dominance.

Just a partial list of spring chores, but the 2424 will put you on top of them so fast you'll probably want to schedule other projects — the ones you've been putting off for years.

And this is the same tractor which will keep you ahead of your mowing later on. Quite a combination. 47 hp (43.5 diesel) in a low profile tractor that outmaneuvers every other tractor in the compact class.

The tightest turning radius ( $8\frac{1}{2}'$ ). The shortest wheel base (70"). Only 51 inches to the top of the hood. And the only tractor in this class with full-time hydrostatic power steering.

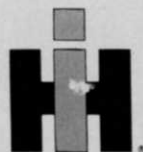




A differential lock that feeds power to both rear wheels regardless of traction. No spin-out. No gouging of turf even when you start up from a dead stop on an up-slope. On side hills it holds the nose straight, prevents down-drifting.

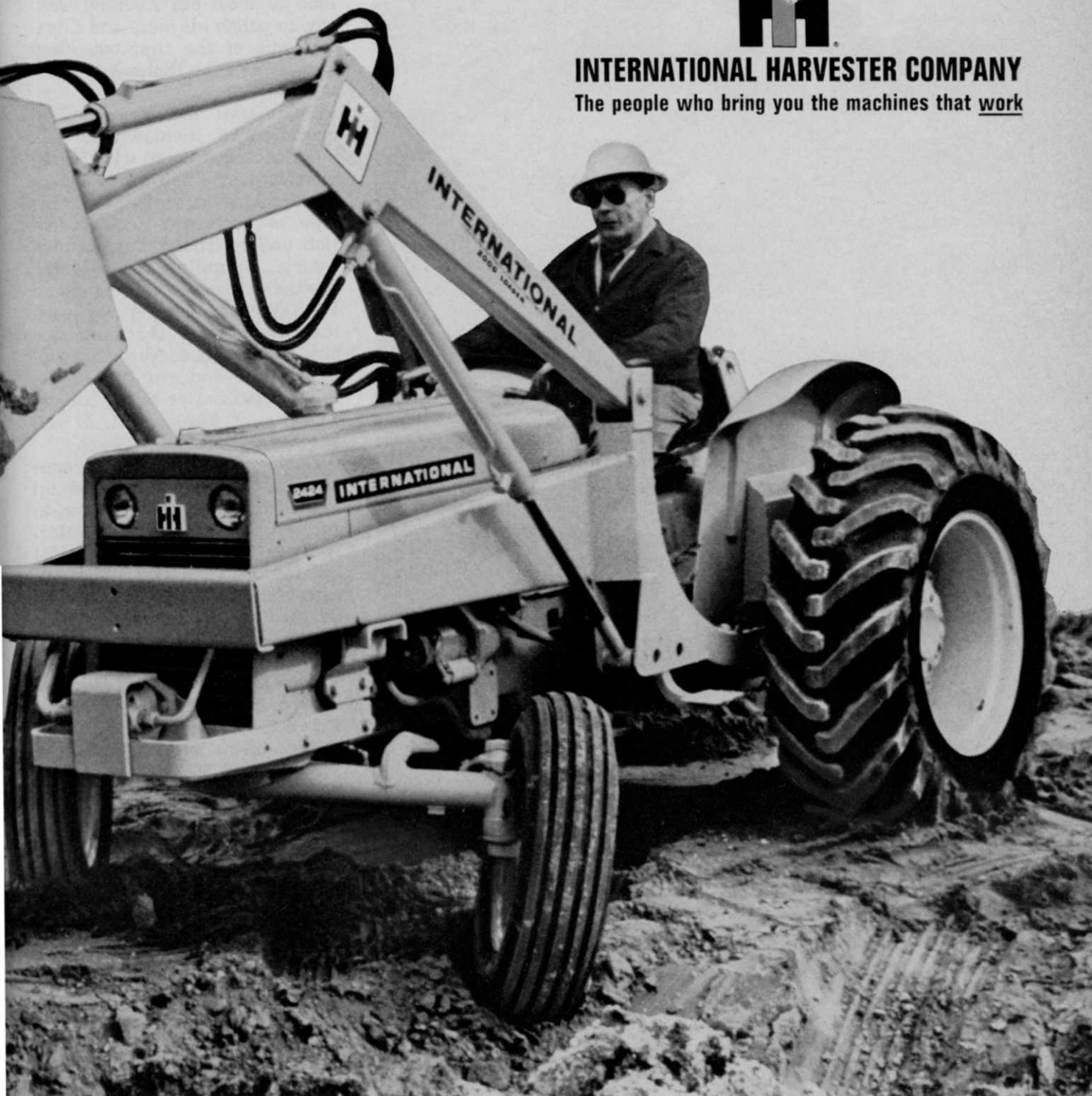
Dual range transmission with 8 forward and 2 reverse speeds (8 and 8 optional for loader work). Live, constant running power take-off. Draft-sensing 3-point hitch. Live hydraulics. Wide, high-flotation tires. And more.

You'll just have to get the rest of the story from your IH dealer. Maybe a demonstration? And he'll be glad to talk several different methods of financing. One, two or three years to pay. Deferred payments—up to three a year with no extra charge. Leasing. Leasing with a purchase option. Or *you* suggest something. He wants to make a deal!

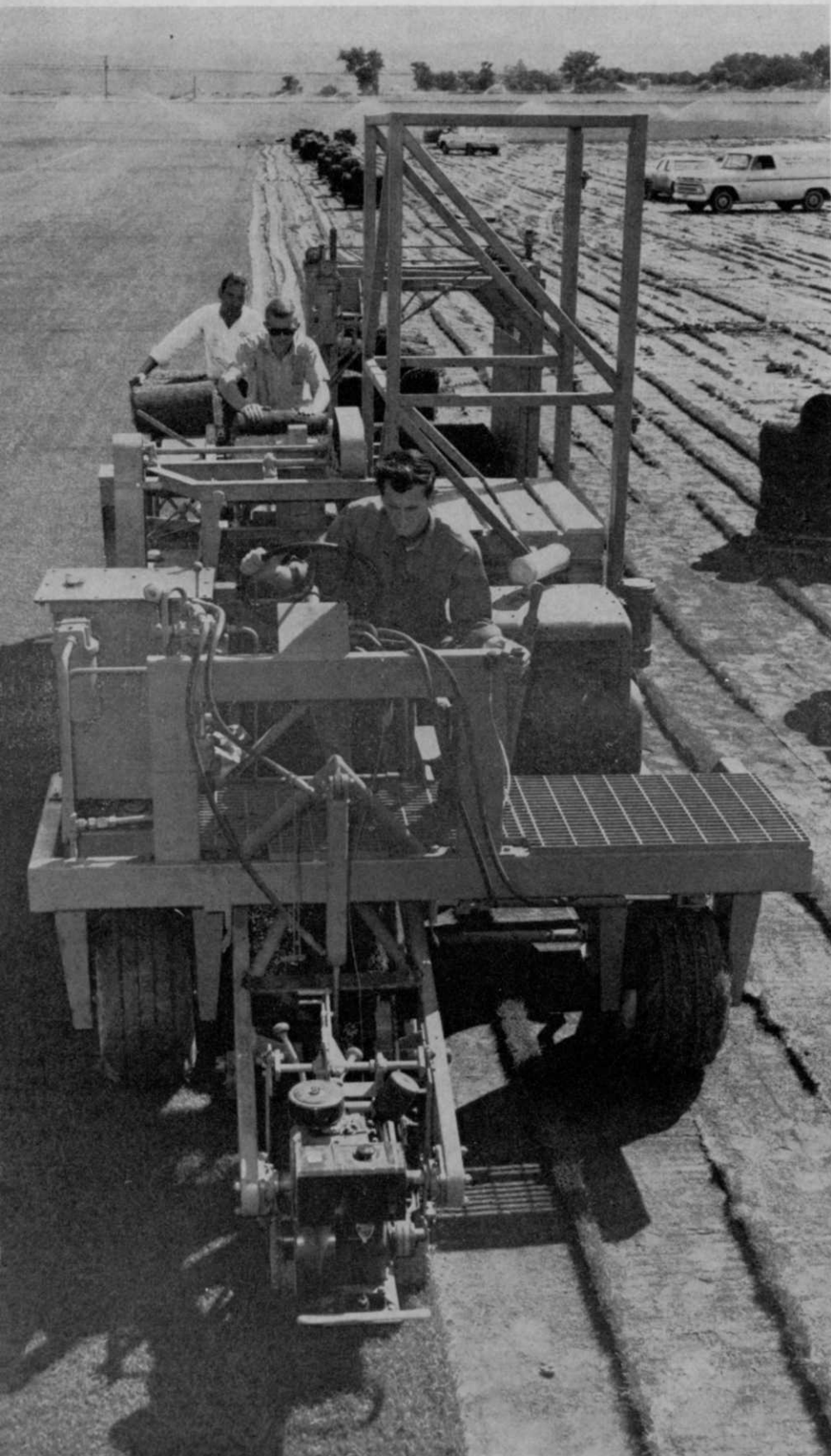


**INTERNATIONAL HARVESTER COMPANY**

The people who bring you the machines that work



# Richlawn's "Turfmaster" Eases Sod Harvesting



With 720 acres of mature sod and a contemplated 250 more acres in 1968, Mel Rich, president of Richlawn Turf Farms, Denver, Colo., grew impatient with the conventional harvesting method requiring a small army of men to roll and load the cut sod. After spending some time designing a new cutter, he engaged Bullock Engineering, Inc., 70 West 6th Avenue, Denver, to polish his ideas and fabricate one of the first true "sod harvesters," the Richlawn "Turfmaster."

Turfmaster has now been in operation at Richlawn for six months. Operating with three men, it does a job that used to require 11 men, with the advantage of round-the-clock operation under floodlight when necessary. Operating the machine are the driver and two handlers. With power steering for easy maneuverability, the harvester cuts sod into a continuous strip, 18 in. wide and a uniform 1 in. thick. Turfmaster has a cutting capacity of 8,000 sq. ft. of sod per hour.

During harvesting, the continuous sod strip is picked up and lifted by chain conveyor to the level of the second operator. A Ryan automatic cutoff knives sod into 6-ft. lengths, which are conveyed to the handler, who lets the sod roll itself. He then places the roll on a transverse belt conveyor, which deflects the roll to another conveyor carrying it to the back of the machine, where the second handler stacks the sod on pallets.

Pallets of 35 rolls each are lowered to the ground every three minutes by a rack and gear arrangement. Another worker picks up pallets with a forklift and loads them on waiting trucks. Powered by a 35-hp. Wisconsin air-cooled engine, the self-propelled harvester is capable of continuous cutting at 5 m.p.h., with an operating speed

range of 40 to 100 feet per minute. A power takeoff drives the various harvester components. Transmission provides high and low forward speeds and reverse. Other features include hydraulic braking and low-pressure tires that will support a load of 10,000 lbs.

#### More Harvesters Planned

Only one Turfmaster has been built to date, and this is employed on Richlawn's main farm, conventional cutters being used on the other two farms. All three locations are southeast of Denver in a lowland area offering an average depth of 12 ft. of loamy subsoil.

As its acreage expands, Richlawn plans to build additional machines for use in its own operation. Turfmaster is being manufactured for sale by Bullock Engineering, and is reported to cost in the neighborhood of \$23,000. Further refinements of the cutter now in the planning stage include automatic stacking and a new guidance system.

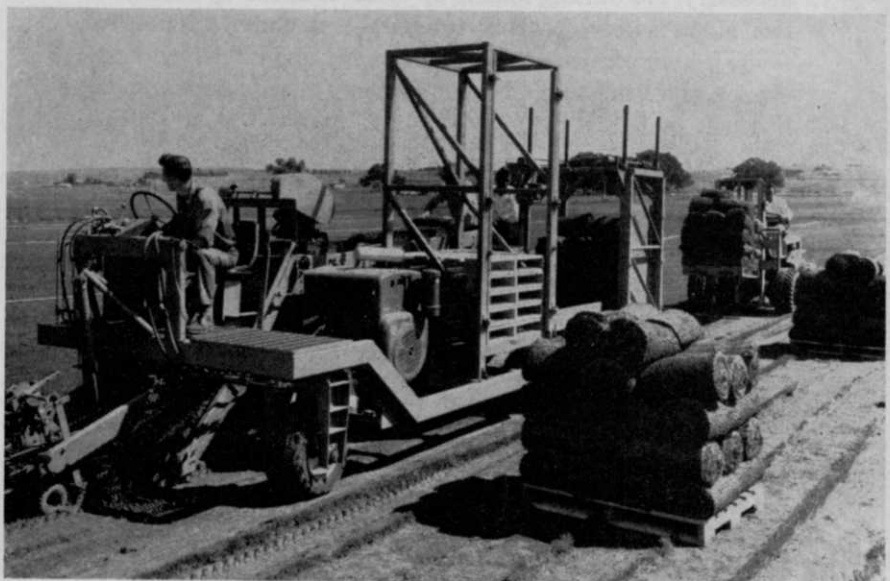
With Turfmaster in operation, Richlawn Turf Farms has an average-day capacity of 100,000 sq. ft. of cut, loaded, and delivered sod, 70% of which is installed by Richlawn personnel. Rich, who moved from landscape contracting into sod production, now confines his contract work to sod installations. The remaining 30% of Richlawn's production is installed by landscapers and homeowners.

Three grass varieties are grown by this Colorado producer: Kentucky bluegrass, Merion, and Scott's Windsor, 200 acres of which were recently established. When sod is stripped, at an average age of one year, fields are immediately reseeded.

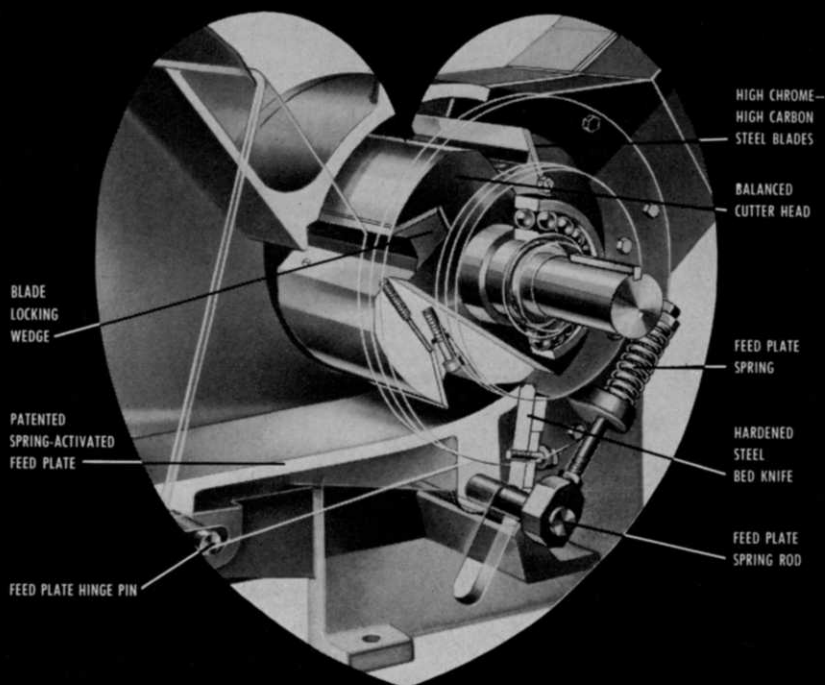
Preparation for initial seeding or for reseeded begins with a five-bottom 14-in. John Deere plow. Ground is then rototilled to a depth of 5 in. with a Howard Rotavator. Pulverized to a fine consistency, fields are leveled with a John Deere 40-20 tractor pulling a 40-ft.-12-ft. blade leveler. Finish grading is done with a 10-ft. Speedco leveler pulled



**Above:** View of Windsor sod field. Richlawn recently established 200 acres of the new turfgrass. **Right:** Mel Rich (left), Richlawn head, and Jim Jones, farm manager, examine Windsor's root structure. **Below:** Forklift truck picks up pallets of sod lowered by Richlawn's Turfmaster. **Opposite page:** Bird's-eye view of the Rich-developed sod harvester.



# No Other Chipper Has ALL These FITCHBURG FEATURES



♥ Look inside a Fitchburg Chipper—note its heart—the spring-activated feed plate. No other chipper has this patented feature that adjusts to the size of the wood up to the machine's rated capacity. Chipping is smoother, quieter, faster, permitting the chipping of larger size wood without the need for extra power or the cost of extra fuel.

The spring-activated feed plate also makes a fly wheel unnecessary. No waiting for the fly wheel to speed up—less worries about safety, bearing troubles—and clutch strain. We invite you to compare the ease, economy and efficiency of operation of a Fitchburg Chipper with any other chipper on the market.

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its rugged construction—safety stop switch—large hinged waist-high feed apron—solenoid switch\*—and patented, quick opening two-way chute.\*

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\*Optional equipment.

## FITCHBURG ENGINEERING CORPORATION

FITCHBURG, MASSACHUSETTS

by a tractor with tandem tires.

### Water Lines Apply Turf Food

High-quality grass seed is planted with a 10-ft. Brillion seeder, and from here management techniques take over. Turf is fed to maturity, with most fertilizers applied through Richlawn's 90 miles of irrigation pipe.

In early spring, and preferably on top of the last snow, an application of dry fertilizer is applied at 200 lbs. per acre. This feeding is a blend of sulphate, nitrate, phosphate, and potash. All other feedings are liquid 10-10-5 or Uran, with ¼ lb. actual N applied per 1,000 sq. ft. at regular intervals of three to four weeks.

According to Mel Rich, applying fertilizers through the sprinkler system gives the best results with less equipment, better coverage, and—most important—less tracking. Richlawn's main irrigation lines are permanent.

Only lateral lines are movable; these are connected and laid out at time of seeding and are spaced at 80-ft. intervals. Laterals stay in place, applying needed water and fertilizers, until harvest. Automatic timers are used throughout. Richlawn's new self-draining Wade Rain system uses 2½- and 3-in. Febco valves, which are buried beneath frost level. Watering has ceased to be a problem, even when freezing temperatures prevail at night, according to the sod producer.

The farm's irrigation water is drawn from 60- to 80-ft.-deep wells, which offer an abundant supply. Asked about their weed problems, Mel Rich said "we have very few weed problems due to preventive maintenance such as mowing, fertilizing, and thatching. A thick, healthy turf will discourage most weeds." First item on his list, regular mowing, is done every four days with a Jacobsen 7-gang F10 diesel tractor mower.

Among prime locations in Colorado and neighboring states that have installed Richlawn-grown sod is the Air Force Academy, where 126,000 sq. ft. of Kentucky bluegrass were placed over heat grids in this country's premier installation of warmed turf.

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**Namely, ORTHO® Paraquat.**

**A herbicide that dries up weeds that clutter up roadsides, fence lines, storage yards. All non-crop areas.**

**ORTHO Paraquat is sure death for many broad-leaved weeds and grasses. Everything from crabgrass to chickweed. Bluegrass to you-name-it.**

**What else is so good about Paraquat?**



**Ugly Customer**

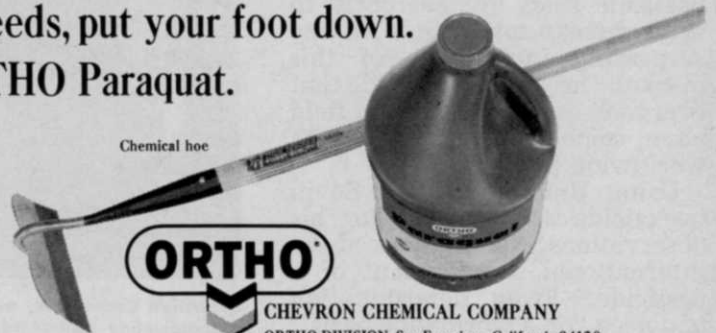
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**Just a little withers up lots of weeds. 1 or 2 quarts in 50 to 100 gallons of water clears an acre. Use it with ORTHO X77 Spreader and get maximum weed control.**



**A little goes a long way**

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**Chemical hoe**

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# Effective Communications, Promotion Needed by Weed Control Industry, Ilnicki Tells Jan. NEWCC

"The public relations problems of a few years ago have awakened researchers in the weed control field to the need for more effective communications and promotion," Dr. Richard Ilnicki, 1966 president of the Northeastern Weed Control Conference, related in his opening remarks to the 21st annual meeting of Northeast weedmen, at New York City's Commodore Hotel, January 4 to 6.

Ilnicki, weed specialist from Rutgers University, New Brunswick, N.J., observed that the industry is doing a good job promoting public relations within its own ranks. "But are these promotions getting out to the public?" he asked. The problem is that many pesticide critics are unable to differentiate between specific chemicals. They are unaware of the contributions of herbicides to agriculture and enhancement of the environment, and of the many new developments in weed control.

To promote the image of agriculture in general, and weed control in particular, industry needs to tell the public more about these new developments. Emphasis should also be placed on the role of agricultural chemicals in other areas, such as recreational and forest lands, Ilnicki suggested.

## An International Look At the Pesticide Picture

Tackling another aspect of the outlook for pesticides, Dr. E. R. Marshall, of Union Carbide International, advised that 60% of pesticide sales are currently in the overseas market. With the surpassing importance of this market, he recommended that everyone in the pesticide field have some perspective of the worldwide picture.

Using Union Carbide's Sevin insecticide as the basis for his observations, Marshall traced the international development of a pesticide. From determination of a need "on a worldwide basis," development moves into the research phase with the search for a product to meet the need. Potential products are evaluated



Dr. B. R. Wilson, Rutgers entomologist, defined the challenge to the Land Grant System as a call for relevant research, teaching excellence, and response to public needs.



Dr. Ernie Marshall, of Union Carbide International, discussed the world pesticide picture. Here he tries out some "protective" clothing used to promote Carbide's Sevin in Egypt.

with the international market in mind, for insect and weed pests are different overseas.

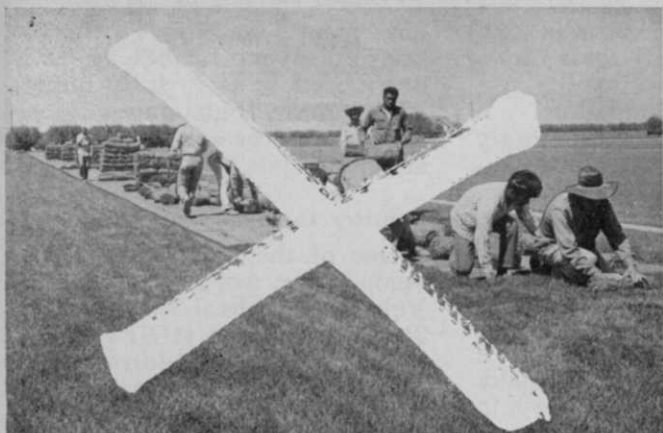
Finally, considerable planning and coordination of development, production, and marketing are required. Overseas sales and promotion has to be set up. It all amounts to an enormous expenditure of time and money before the product is on the market. To Marshall, one of the chief problems ahead lies in finding ways to reduce this continually growing expenditure.

Another problem for producers is the expanding influence of international agencies over foreign pesticide acceptance. U. S. manufacturers need to do a better job of overseas selling, particularly before these influential agencies. This is most true of herbicides, Marshall said, because the benefits of chemical weed controls are little known and emphasized in comparison with other pesticide uses.

Reviewing the American Land Grant System, Dr. B. R. Wilson,



Executive Committee, which planned and directed NEWCC's 21st annual meeting, is shown at a coordinating conference. Seated (left to right) are Dr. Arthur Bing, secretary-treasurer; Dr. Gideon D. Hill, past president and awards chairman; Dr. Richard D. Ilnicki, conference president for '66; and Dr. John E. Gallagher, vice president and '67 president. Standing (left to right) are Dr. Chiko Haramaki, research coordinating chairman; Dr. William V. Welker, program chairman; Kenneth P. Dorschner, sustaining membership chairman; and Dr. Homer M. LeBaron, public relations chairman.



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## Meeting Dates



**National Arborist Assn., Midwinter Meeting.** International Inn, Tampa, Fla., Feb. 12-15.

**Maryland Arborist Day,** University of Maryland, College Park, Feb. 14.

**Florida Pest Control Conference,** University of Florida, Gainesville, Feb. 14-16.

**Weed Society of America, Annual Meeting,** Statler-Hilton Hotel, Washington, D.C., Feb. 14-17.

**Cornell Turfgrass Conference,** Statler Hall, Cornell University, Ithaca, N.Y., Feb. 20-23.

**NE Ohio Horticultural Trade Meeting,** Sheraton-Cleveland Hotel, Cleveland, Feb. 21-22.

**Southern Turfgrass Conference,** Sheraton-Peabody Hotel, Memphis, Tenn., Feb. 27-28.

**Massachusetts's Nurserymen's Short Course,** Waltham Field Station, Waltham, Feb. 28-Mar. 1.

**Maryland Sod Conference,** University of Maryland, College Park, Mar. 2.

**Midwest Regional Turf Conference,** Purdue University, Lafayette, Ind., Mar. 6-8.

**Southern Shade Tree Conference,** John Marshall Hotel, Richmond, Va., Mar. 12-15.

**Iowa Turfgrass Conference,** Hotel Savery, Des Moines, Mar. 13-14.

**Michigan Turfgrass Conference,** Kellogg Center, Michigan State University, East Lansing, Mar. 15-16.

**Western Weed Conference,** Westward Ho Hotel, Phoenix, Ariz., Mar. 15-17.

**Northern California Turfgrass Exposition,** Strybing Arboretum, San Francisco, Calif., Mar. 22-23.

**New England Chapter, International Shade Tree Conference Annual Meeting,** Sheraton-Eastland Hotel, Portland Ore., Mar. 30-31.

**Nebraska Program on Selection and Handling of Pesticides,** University of Nebraska, East Campus, Lincoln, Apr. 3-4.

**Florida Turfgrass Trade Show,** Diplomat Hotel, Hollywood By The Sea, Fla., Apr. 27-29.

**Western Chapter, International Shade Tree Conference, Annual Meeting,** Hotel Coronado, San Diego, Calif., Apr. 30-May 3.

Rutgers University entomologist, told conferees that there is a five-fold challenge ahead if the system is to fulfill its mission.

First, it will be increasingly necessary for individuals engaged in their own private researches to work together in interdisciplinary projects. Second, it is essential that research be kept relevant and that unnecessary projects be discarded. Third, competent young men must be brought into the field. Fourth, it will be necessary to establish and strengthen international educational programs. And, fifth, the challenge of environmental pollution will have to be met; calling this one of the great issues of our time, Dr. Wilson warned that action is needed now.

### Panel Considers Ways To Enhance Herbicides

Of particular interest at this year's conference was a panel of three experts, who considered herbicide combinations, surfactants, and incorporation and irrigation as means of stimulating herbicide activity.

Dr. L. L. Danielson, USDA, Beltsville, Md., suggested that the main reasons for using herbicide combinations are to broaden the spectrum of control, to reduce amounts of herbicides, to cut costs and residues, and to make full use of available chemicals. What rates of each herbicide can be used in combination? What adjuvants should be used? What are crop tolerances to combinations (since these differ from tolerances to herbicides used singly)? More information is needed on how herbicides interact and how they affect plant metabolism before these questions can be fully answered, Danielson indicated.

"There hasn't been too much work in the area of herbicide-surfactant relationships," Dr. Ilnicki told the gathering. The question has been approached on a trial and error basis, and some information is gradually being collected. It is still difficult to know that a particular surfactant and herbicide will work well together, a problem under study at the New Jersey Experiment Station.

Dr. Robert Sweet, Cornell University, Ithaca, N.Y., emphasized that the effect of incorporation and irrigation on herbicide activity varies from one

chemical to another. Until the relation of herbicides to soils and plants is more fully understood, many outstanding questions cannot be answered, Sweet added.

### Industry Developments Debut

One of the new products developed for weed controllers is Velsicol Chemical Corp.'s OCS-21963, introduced at NEWCC by Velsicol's Dr. Gideon Berger. Primarily a preemergence killer of annual weeds and grasses, the chemical also controls some broadleaf weeds. Velsicol hopes to have an experimental label by the end of 1967. Bluegrass turf has shown sufficient tolerance to OCS-21963 at rates up to 5 or 6 lbs. per acre to warrant further testing for turf use, weedmen were told.

A newly developed roadside sprayer designed for economical one-man operation was explained by Thomas McMahon, McMahon Brothers, Inc., Tenafly, N.J. In operation, he said, the sprayer can cover up to 30 ft. from roadsides without drift, in winds up to 20 m.p.h. Development trials with the equipment, which features interchangeable spray arms, have covered a million miles of roadsides, according to McMahon.

Offering technical data on Diamond Alkali's recently introduced Dacagin spray gel was Dr. William Sprayberry. Intended for use with conventional spray equipment, Dacagin is a low viscosity liquid while being agitated or pumped, but a high viscosity liquid after passing through a nozzle, Sprayberry noted. The thickener can be used with water soluble materials, emulsifiable concentrates, and wettable powders.

Lee D. Greenwood, product engineer for FMC's John Bean Division, spoke on the adaptability of Bean's Rotocast sprayer to special needs of weed and brush controllers. Rotocast is an air sprayer attachment, which is usually truck-mounted but has also been used behind trailer-type sprayers. Air outlet is shaped to provide a proportioned column of air adaptable to both broadcast and spot spray needs, with a wide range of vertical and horizontal positions.

Shell is continuing its evaluation of SD-11831 (Planavin) and hopes to have registration in 1967, Dr. Jamie Wilson, Shell



**FOR SMALL JOBS** — 5'4" unit puts seed in top 1/4" of soil, the ideal depth for closely controlled moisture and growth conditions.

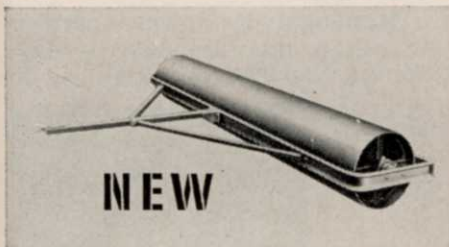


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**ALSO AVAILABLE — NEW SMOOTH-WHEEL ROLLERS** for smoothening humps and winter-heaves in established lawns. Ideal for parks, stadiums, golf courses, institutional, and turn-pike turf. In 9', 10'6" and 12' single rollers and triple gang models up to widths of 20'.

Only Brillion enables you to choose the seeder that fits your operation — in 5'4", 8' and 10' seeding widths. And all are precisely built and calibrated to tuck your seed accurately and uniformly in the top 1/4" or 1/2" of the soil for fast, complete germination and healthier growth.

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Large hoppers minimize re-fills. And you can hug fences, trees and building foundations to keep hand broadcasting to a minimum. Options include transport wheels for the 8' and 10' seeders. So to seed more lawn and save more money, include a Brillion Landscape Seeder in your budget. Send coupon for complete information.

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scientist, told the group. A pre-emergence chemical for control of grassy and broadleaf weeds, it is available to university and other cooperating testers in 75% wettable powder and liquid suspension formulations. A special low-concentrate formulation has shown promise for weed control in turf, as have mixtures of the herbicide with fertilizer, Wilson concluded.

#### Power Companies View Vegetation Control

"Pennsylvania Electric Co. recognized the need to improve the appearance of its many facilities located in a service area that occupies 40% of Pennsylvania," John B. Middleton, Superintendent of Forestry for Penelec, told participants at a session on industrial weed control.

Penelec's program begins before rights-of-way are opened with a determination of low-growing native trees and shrubs that should be saved. Clearing contractors are then required to avoid damage to these plants, which are used to establish buffer strips on both sides of

improved highway crossings. Stump treating is included in initial clearing to eliminate tall-growing trees. In some cases, screens of selected materials are planted along major highways and population centers.

"The numerous techniques of vegetation control chemical application are utilized to gain economy and retain natural beauty," Middleton stressed. "Selective control through the use of water-borne stem foliage treatment and selective basal treatment allows us to save desirable shrubs and low-growing vegetation."

"Chemical brush control offers the best economics for Potomac Edison in keeping our rights-of-way free of brush," according to Potomac's R. L. Dalton, who continued the discussion. To compare costs between chemical and hand or mechanical clearing methods, the company initiated studies which have placed hand clearing costs at \$141 per acre in 1962 and \$215 per acre in 1965. During this same period, chemical control costs have averaged about \$65 to \$75 per acre.

Three methods of mechanical



John B. Middleton, forestry supervisor of Pennsylvania Electric Co., told of Penelec's efforts to improve rights-of-way appearance.

cutting were also compared: discing, bulldozing, and clearing with a "Tree Eater," a front-mounted flail cutter. In all cases, chemicals proved most economical unless there were specific circumstances that ruled out spraying.

"To my mind there are two important unresolved questions in chemical brush control," S. S. Russell, Senior Lines Engineer for West Virginia's Monongahela Power Co., told the audience of industrial weed and brush controllers: "How clear should the right-of-way be? And, how much of what chemical applied by what technique will accomplish this?"

Monongahela Power operates in rough, mountainous country. Where the land is unnatural or



S. S. Russell, Monongahela Power's senior lines engineer, cited application difficulties in W. Va.'s mountains, called for more sophisticated equipment.



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Around storage warehouses, parking or work areas, and loading docks — Eliminate unsightly weeds that rust equipment, improve the over-all appearance of the sites with "Hyvar" X or "Hyvar" X-WS. The result: excellent, long-lasting control of unwanted vegetation.

Profit by "plus" business — offer your customers effective, low-cost control of unwanted vegetation wherever it grows with "Hyvar" X bromacil weed killers, or products containing bromacil.

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...through Chemistry



Two familiar convention sights are caught here: Above, the signing-in which registered nearly 700 delegates under Dr. Bing's direction. Right, the passing of the gavel (this one made from Rutgers' historic Kilmer oak), here being transferred from '66 president, Ilnicki, (right) to '67 president, Gallagher (left).



unimproved, the company employs "less expensive, less thorough re-clearing." "We want the right-of-way to be in harmony with the landscape," Russell said. As for the second point, he made it clear that, in his area at least, the key question is that of application technique. Last year, three out of four acres were helicopter sprayed. Yet, he admitted, helicopter spraying still has drawbacks. So do other spray methods the company has employed.

Defining the problem as one of logistics, Russell contended that "we need to strive for the same degree of sophistication in mechanical applicators that has already been attained in chemistry."

#### Spray Additives Described

A paper prepared for NEWCC by John H. Kirch and James E. Esposito, of Amchem Products, Inc., described the development of Emulsavert, a new type of invert emulsion. "In the Emulsavert system," conferees were

told, "2,4-D and 2,4,5-T are present in the oil phase as a blend of oil-soluble acids and amine salts rather than as esters."

Most chemicals, however formulated, can be added to the water phase of the emulsion and be compatible with the system. "By carefully studying the efficiency of available chemicals on individual woody species it should be possible to prescribe for use with these invert systems chemicals that have hitherto had too narrow a spectrum of activity to warrant marketing as general brushkillers." Amchem's specialists concluded that "such studies should prove particularly rewarding to right-of-way managers faced with the serious problem of difficult-to-kill species."

In tests of both invert and conventional emulsions applied by helicopter equipped with Amchem's Spray-Disk, Professor W. E. Chappell, of Virginia Polytechnic Institute, Blacksburg, reported that the conventional emulsion "resulted in many

more droplets drifting greater distances than was the case with the invert mixtures." Amchem's Envert and Emulsavert were inverts studied in these trials.

Spray drift was also the concern of researchers of The Dow Chemical Co., as tests on the effectiveness of Dow's Norbak particulating agent were released. Tordon 101 mixture was applied with Norbak by a truck-mounted sprayer covering a 20-ft. swath at 9 m.p.h. in two passes (total spray was 40 gals. per acre). Dow reported no drift of consequence beyond 10 ft. of the spray swath when winds were less than 5 m.p.h., and beyond 25 ft. when winds were up to 12 m.p.h.

#### Turf Session Studies Crabgrass Controls

Presenting data on crabgrass control tests at NEWCC's morning session on turfgrass weeds were Dr. J. A. Jagschitz, University of Rhode Island, Kingston; Dr. J. M. Duich, Pennsylvania State University, University Park; J. H. Dunn, research assistant at Rutgers; and Dr. J. F. Cornman, Cornell University.

Leadoff man, Dr. Jagschitz, who also chaired the earlybird turf program, discussed tests on timing of preemergent herbicide applications. "Good crabgrass control with only slight turf injury was obtained with Bensulide, DMPA, and H-9573 (Azak) when applied seven and three weeks before emergence started. Bandane and SD-11831 (Planavin) also gave good control but with slightly more injury," Jagschitz recounted.

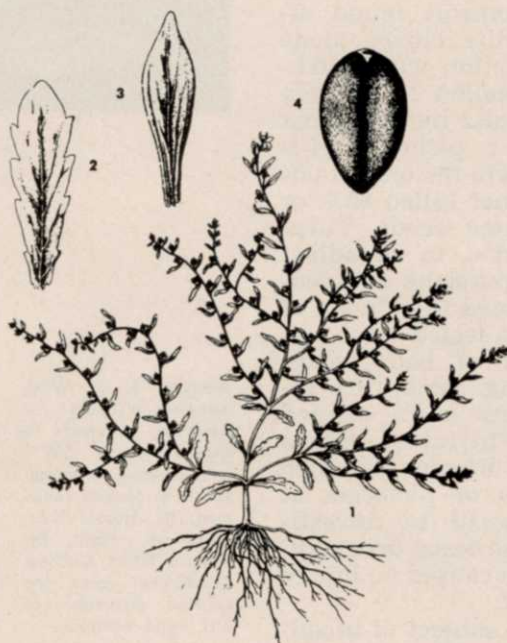
On May 31, when about 22% of crabgrass had emerged, good control with only slight injury was obtained from Bensulide, SD-11831, and siduron at rates, respectively, of 10, 2, and 8-12 lbs. The Rhode Island turf researcher also noted that "none of the treatments applied when 54% of the crabgrass was present gave good control."

Dr. Duich told turfmen of trials on bluegrass and bentgrass tolerances to crabgrass herbicides. Among the most effective chemicals were siduron, which gave 90 to 100% control without turf injury, and benefin with 90% control at 4 lbs. Benefin caused slight injury to bent at 2 and 4 lbs., and to bluegrass at 4 lbs.

"Results from four to seven years of testing showed Bandane,

## PURSLANE SPEEDWELL

(*Veronica peregrina*)



Purslane speedwell is sometimes known as neckweed or winter purslane. A native plant, it is widely spread over the eastern and central United States and is also found in the extreme Northwest.

This plant is an annual or winter annual that reproduces by seeds. It is found in gardens, lawns, fertile feeds, and waste places. Its fibrous root system usually seeks moist, rich soils.

Seldom over 8 inches tall, stems are erect and have many branches (1). Stems have a smooth surface and may be slightly hairy. Leaves from the lower stems of the plant (2) are somewhat toothed and grow oppositely, while those on the upper stems alternate and have smooth edges (3).

Small, white flowers of the purslane speedwell grow in axils of upper leaves and at the terminals.

Seed pods are flat, heart shaped, and about  $\frac{1}{8}$  inch wide. Seeds (4) are flattened, oval, and have a scar on one side. They are a translucent, glossy, orange yellow.

Purslane speedwell will produce a large number of seeds, but the young seedlings are easily destroyed by harrowing land. This plant is not easily destroyed by chemical means. However, repeated applications of 2,4-D or 2,4,5-T at 1 to 2 pounds per acre, or a heavier than normal application, should bring it under control.

chlordane, calcium arsenate, and DCPA were more effective when applied in early spring than late spring," J. H. Dunn pointed out as he disclosed Rutgers' timing test results. DMPA showed no response to date variation. With less time under test, benefin, H-9573, and trifluralin did not respond to timing variation, while Bensulide, SD-11831, siduron, and Sindone seemed to perform better under earlier application.

In another phase of the test, comparison of carrier types, it was established that "applying preemergence herbicides with dry carriers was more successful than applications with water." This, Dunn noted, was true of all materials tested except trifluralin. Bandane, chlordane, and siduron, for example, provided unsatisfactory control with water, as compared to far better or very good control when applied dry.

Confirming results with newer preemergence crabgrass chemicals tested in mixed red fescue-bluegrass turf were announced by Dr. Cornman. "Under conditions of these trials, SD-11831, D-263 (Sindone), benefin, and siduron provided essentially complete preemergence crabgrass control," he related. All were applied in granular form.

Turning to preemergence control of *Poa annua* in bents, Dr. Duich summarized Penn results by noting that "fall applications of bensulide were found to be the most effective with least injury to bent of herbicides tested. Root injury was evident, but only under moisture stress."

A Vermont study on the density and frequency of weeds on golf greens, and recommendations for hawkweed and spotted spurge control closed out the morning turf session. To control hawkweed, Dr. Jagschitz suggested combinations of 2,4-D plus dicamba or silvex applied in May, or 2,4-D plus dicamba or mecoprop applied in September. Two applications of dicamba plus 2,4-D or of silvex can control spotted spurge.

### Turf Talks Turn to Broadleaf Problems

Penn State tests show dicamba to be just as effective in dry form as in liquid, Duich told turf-oriented conferees. However, dry 2,4-D is not comparable to spray formulations, which

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)

limits dry combinations of the two chemicals. "Broad spectrum weed control value of dicamba-2,4-D combinations can be increased by improving the wetting qualities of a formulation," he counseled. Also, adding  $\frac{1}{16}$  lb. of picloram will help, though he added that more data is needed on its safety.

Reporting controls found effective for white clover alone and in combination with stitchwort and dandelion in fairway turf, Dr. Jagschitz revealed that picloram and a picloram-2,4-D combination were the only treatments tested that killed 92% or better of all three weeds. Turning his attention to broadleaf plantain and purslane in seedling turf, he noted that "none of the treatments tested gave excellent control of both weeds without causing some turf injury." Jagschitz then offered this thought: "In future tests a combination of bromoxynil with either dicamba or picloram at low rates should be investigated." In these tests, bromoxynil at  $\frac{3}{4}$  lb. rate caused no injury to seedling turf.

Again on the subject of broadleaf weeds in seedling turf, Dr. Duich revealed that brominil and ioxynil showed less damage to seedling turf than 2,4-D and dicamba. "With a few exceptions," Duich said, "fescue and bent were most sensitive to herbicides."

From across the Northern



Above, B. J. Watt, Sherwin-Williams of Canada, answers a question on SW's mixed herbicide formulation as session chairman, Dr. Harold Kerr, looks on. Right, Dr. Richard Otten, Amchem Products, joins the spirited discussion of turf weed control.



border, B. J. Watt, of Sherwin-Williams Co. of Canada, brought a report on SW's 2,4-D-MCPP-dicamba mixed herbicide formulation. Respectively, 16, 16, and 1.5 ozs. per imperial gal. are used. This combination, at 1 gal. per acre, Watt said, "has proved

the most effective mixture found to date for control of the widest range of turf weeds while at the same time providing the greatest safety margin to nearby ornamentals." August and September applications at half to a quarter of the usual dose are also safe to Penncross, Seaside, and Highland bents, Watt said.

At this point, the turf session evolved into a lively discussion. In a rare moment of complete agreement, Dr. Henry Indyk, Rutgers extension specialist, and Dr. Harold Kerr, USDA, Beltsville, who chaired the session, echoed a prime concern facing turf weed controllers in the years ahead: selective control of grassy weeds in turf. Tall fescue is a particular problem, experts say. Where is it all coming from? Duich thinks a major source of this problem is "economy" grass seed mixtures.

#### Water Problems Discussed

While the Northeast's water problems did not affect the nearly 700 weed controllers meeting in New York, water problems of a different sort did provide the focus for a small but enthusiastic gathering of aquatic weedmen.



Reporting results of turfgrass weed control studies were (left to right) Dr. J. A. Jagschitz, University of Rhode Island; Dr. J. M. Duich, Pennsylvania State University; Dr. J. F. Cornman, Cornell University; and Dr. T. R. Flanagan, University of Vermont.

Behavior of copper sulfate in small ponds was explored by Dr. Donald Riemer, of Rutgers. His conclusions: Application of crystals, which sink to the bottom, provide less compound in solution than theoretically expected. Nor does the copper form a heavy concentration near the bottom. This behavior may be due to absorption by bottom muds, Riemer speculated. Greater concentrations result from applying copper sulfate in solution, though a heavy bloom of algae will quickly reduce the amount of copper in a treated pond.

In another aquatic paper, Dr. Riemer concluded that repeated mowing of spatterdock, while not adequate to control the water weed, may well increase the effectiveness of herbicides. David L. Sutton, research assistant from Virginia Polytechnic, reported that analyses for simazine in treated ponds seem to show that fish are free of simazine once the water is free.

Continuing aquatic talks, John H. Steenis, of the Patuxent Wildlife Research Center in Laurel, Md., observed that a combination of dicamba and 2,4-D shows promise for control of waterchestnut. "Treatments made during early flowering were questionable," he said, "while those made during the period of early to late seed maturation were successful."

#### 1967 Officers Named

With barely an hour's break in the busy round of discussions aimed at varied interests of weedmen in attendance, NEWCC paused to name its officers for the coming year and to issue a few well-deserved thanks to those of the past. Dr. John Gallagher, Amchem Products, Inc., Ambler, Pa., will head the conference in 1967, with Dr. John Meade, Rutgers weed expert, in the vice president's seat. Dr. Arthur Bing, Cornell Ornamentals Research Laboratory, Farmingdale, N.Y., continues to serve as secretary-treasurer.

With these officers at the helm, the Northeastern Weed Control Conference plans to hold its 22nd annual meeting on January 3, 4, and 5, 1968. Again, New York City's Commodore Hotel will be the site, and for three days out of the year at least, weed control capital of the Northeast.



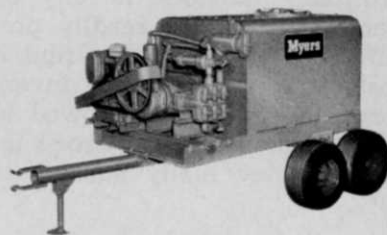
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# Profit, Safety, Unusual Tree Problems Accented at Indiana Arborists' Jan. Meeting

By DR. PAUL E. TILFORD

"Net profit, the goal in all business, depends on many interrelated factors, such as price, sales volume, cost of goods or services, and expenses," Don Surber, of National Cash Register Sales, told the Indiana Arborist Association at the opening of its 18th Midwinter Conference, January 4 to 6, at the Claypool Hotel, Indianapolis, Ind.

The price charged for goods or services deserves more consideration than some arborists give to this important phase of their business, Surber continued. Prices must be directly related to the costs of a particular business and should not be overly influenced by competitors' quotations.

It is easy to lose money on small jobs. Therefore, special attention should be given to charging if these constitute much of the business. Sometimes, an increase in price of as little as 5% can boost net profit considerably. Volume of sales is also important to any business, but a continual increase is not always profitable if accompanied by increased sales costs. Surber pointed out that "many times, less volume will give more profit."

Supplies and equipment for use in the business or resale usually can be bought at better prices with quantity purchases. However, it may not always be profitable to stock heavily on items that can be readily procured. Many businesses find it costs about 14% to hold inventory. If capital is borrowed at 6%, the cost of holding excess inventory may really amount to 20%.

## Aerial Safety Stressed

Panelists discussing aerial lift safety during tree trimming were John Harley, Indianapolis Power and Light Co.; Rex Wilkinson, Muncie Tree Surgery

Corp.; and Paul Ramsey, N. G. Gilbert Corp., Muncie.

Harley emphasized that only original parts supplied by equipment manufacturers should be used to make repairs. Make-shift substitutes can cause serious accidents, he noted, citing a case where a section of hydraulic hose containing metal reinforcing strands was used to replace a broken pneumatic hose. This destroyed the insulating qualities of the boom and a man was electrocuted later when it was pushed into a high voltage line.

Some cheap black hoses contain enough carbon to be conductors and should never be used on aerial lifts. Harley also stressed the importance of safety belts for the man in the bucket.

Rex Wilkinson reported National Safety Council studies of 184 aerial lift accidents. Of these, 47 were due to equipment failures and 137 to operator failures. Equipment failures were mostly caused by boom bolts and welds breaking and by failures in hydraulic mechanisms.

Paul Ramsey recommended daily inspections of aerial equipment made jointly by the operator and crew foreman. The machine should be run through all its movements, and cables and hydraulic systems especially should be checked for flaws, with an inspection sheet for a guideline. Aerial lifts should also be examined by factory-trained personnel at least once every 12 to 15 months, Ramsey advised.

Turning to arborists' public relations, Noel Wysong, secretary of the Midwestern Chapter, International Shade Tree Conference, emphasized the importance of advertising and publicity material, telephone image, correspondence, conduct of workmen, appearance of equipment, personal contacts, and most im-

portant, quality of work. "Establishing good public relations in the community is a job that can't be done in a day or a week. In fact, it's a job that is never completed; it must be worked at constantly," he counseled.

## Unusual Tree Problems Accented

A highlight of the Hoosier arborist gathering was Dr. J. C. Carter's discussion of uncommon and unusual tree diseases. Dr. Carter, Head of the Section of Applied Botany and Plant Pathology, Illinois Natural History Survey, Urbana, described some lesser known leaf diseases: *Dothistroma* pine needle blight, oak leaf blister, *Actinopelte* leaf-spot of oak, island chlorosis of hackberry, and hackberry mosaic.

Pine needle blight, oak leaf blister, and oak leaf spot are caused by fungi, he observed. Spraying for pine needle blight with such fungicides as Bordeaux mixture or organic mercury during April and early May has been recommended, but has not controlled the disease in Illinois. Spacing trees at wider intervals to permit free movement of air between will help reduce infection and defoliation, Dr. Carter recommended.

Oak leaf blister is adequately controlled with one Bordeaux spray applied before buds open in spring, while *Actinopelte* leaf-spot does not cause sufficient damage to warrant treatment. Island chlorosis of hackberry seems to be associated with heavy infestations of the potato leafhopper, *Empoasca fabae*. Cause of leaf mosaic or yellows and stunt of hackberry has not been determined, Carter noted. He suggested that affected trees be removed and destroyed since they are deformed in growth and appearance.

A bacterial canker of oak,



sweet gum and elm, Fusicoccum canker of mountain ash, Melanconium canker and dieback of birch, and Botryosphaeria canker of redbud and tupelo were among unusual bark diseases discussed by Dr. Carter. Usually, he pointed out, these diseases are more severe on less vigorous trees and on those growing under unfavorable conditions.

Watering during dry periods, fertilizing to stimulate growth, surgery in some instances (when the affected areas can be pruned away), and complete removal of trees not responding to treatment for these bark diseases were recommended controls.

Stem diseases covered by the Illinois expert included witches-broom in pine, spruce dwarf, and fasciation. Causes of these unusual diseases are not known. Witches-broom in pine and fasciation disease of several species can usually be controlled by pruning away the affected branches. Spruce infected with dwarf disease should be removed and destroyed.

#### Too Many Trees

Dr. Paul Tilford, editor, International Shade Tree Conference, described the typical small-city street tree problem as one of "too many trees of the wrong kinds." This situation has come about because most small cities have not controlled street plantings. Abutting property owners have planted—and usually overplanted—whatever kinds of trees they wished. In many places these practices continue, with the result that each spring brings new problems that will become serious 25 years later.

To prevent such problems, cities must take over control of street trees by ordinance, Dr. Tilford stated. Cities must either plant the trees or require abutting property owners to obtain permission before planting approved trees at properly spaced intervals. Without control, new problems will continue to be created. Dr. Tilford cited the street tree ordinance of Wooster, Ohio, and the Wooster Shade Tree Commission as one small city's effort to do something about its shade tree problems.

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## Something for All Turfmen At Midwest Meet, Mar. 6-8

Golf course superintendents, sod growers, park and roadside men, suppliers, nurserymen, teachers and researchers, and others—both beginners and “old hands”—will find discussions directed toward them when the Midwest Regional Turf Conference convenes Mar. 6 at Purdue University, Lafayette, Ind., for its annual three-day confab.

Following the Monday afternoon opening on a sales note, speakers in eight different areas of turf work will offer their evaluations of “Trends for Turf Managers.” Wrapping up the opening session will be talks on cost cutting and soil warming. Midwest Regional Turf Foundation will hold its annual banquet on Monday evening.

Tuesday morning, participants will reconvene in special sessions for golf course interests, general turf interests, and sod growers. Golf men will look at “Personnel on Wheels,” “Automatic Irrigation Saving Time,” and “Upgrading from *Poa annua* and Crabgrass”, then will hear personal experiences with different grass varieties from experts in the field. General turfmen will consider seed supplies, St. Louis Stadium, and “Performance of New and Old Turfgrass Varieties,” among other topics. “Developing a New Sod Farm” and “Sod Farm Irrigation” are two subjects on tap for sodmen. Set for Tuesday afternoon are discussions of various ways to regulate irrigation water.

On Wednesday, Mar. 8, basic information on grass varieties, soils, grass development, sod, and herbicides will be offered for fledgling turfmen. Oldtimers will hear talks on ornamental horticulture training and artificial turf, as well as new ideas

on wilt reduction, herbicides, and additives. Readers desiring more information on this conference, which has a \$10 registration fee, should contact Dr. W. H. Daniel, Department of Agronomy, Purdue University, Lafayette, Ind. 47907.



**James Burdett** (standing, right) 1966 president of the Illinois Turfgrass Foundation, looks on as three featured speakers discuss the program for December's 7th University of Illinois Turfgrass Conference. Seated is **Dr. M. C. Shurtleff**, University of Illinois plant pathologist, who urged participants to use caution in tank mixing of turf chemicals because of the lack of basic knowledge on compatibilities, and offered some combinations not recommended because of known incompatibilities. Standing (left) is **Dr. Roscoe Randell**, U. of I. entomologist, who related sod webworm damage in bluegrass turf to management practices, pointing out that good management (irrigation and monthly fertilization) during the hot, dry summer months of webworm buildup can help grass to “outgrow” a good bit of the damage. Standing (center) is **Dr. Paul Rieke**, Michigan State University staffer, who investigated techniques for growing sod on Michigan's muck soils, where its production has become the fastest growing segment of the state's agricultural industry. The Conference drew specialists from across the country with its exchange of up-to-date ideas for maintaining quality turf. Proceedings are published by the University of Illinois, which sponsors the event in cooperation with the Illinois Turfgrass Foundation.

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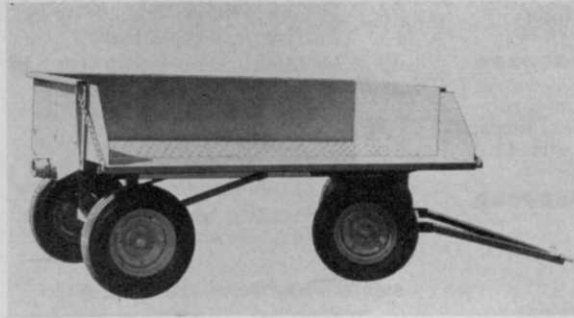


**Virginia Hosts Dixie Arborists, Mar. 12-15**

Arborists from throughout the South will gather at the John Marshall Hotel, Richmond, Va., for the '67 Southern Shade Tree Conference, Mar. 12 to 15. Equipment exhibits and educational sessions will get underway Monday morning, with the role of trees in recreation, problems in highway beautification, new insecticide developments, and safety in tree work among opening topics.

Conference participants will tour Richmond's Park System and see arborists' equipment demonstrated on Tuesday. Wednesday's activities will return to the host hotel, with discussions to include tree planting programs, economics of underground utility lines, and a forum on utility-municipality cooperation.

For more details, contact Gordon Scott, secretary, Southern Chapter, ISTC. Address: Director, Tennessee Botanical Gardens, Cheekwood, Nashville, Tenn.



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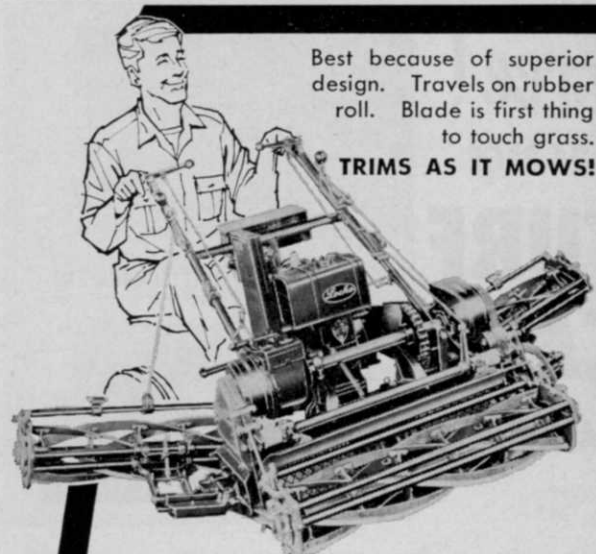
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# Insect Report

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

## Turf Insects

### A BILLBUG

(*Sphenophorus phoeniciensis*)

**Arizona:** Medium infestation reported in many lawns in Salt River Valley. Larvae are feeding on roots.

### A FLEAHOPPER

(*Spanogonicus albofasciatus*)

**California:** Nymphs and adults infesting dichondra lawns at Orange, Orange County.

## Insects of Ornamentals

### APHIDS

**New Mexico:** *Cinara* spp. heavy on various junipers in Albuquerque, Bernalillo County. **Oklahoma:** *C. tuja-filina* appearing in evergreen hedges at Stillwater, Payne County.

### ARMORED SCALES

**Alabama:** *Phenacaspis pinifoliae* reported on isolated loblolly and slash pine in ornamental plantings in Lee County. **California:** *Aonidiella citrina* heavy on cymbidium plants at La Mesa, San Diego County.

### A WHITE FLY

(*Tetraleurodes acaciae*)

**California:** Medium on coral trees in San Diego County.

## Tree Insects

### APHIDS

(*Eulachnus* spp.)

**Alabama:** Feeding and increasing on pine needles in central part of the State.

### SMALLER EUROPEAN ELM BARK BEETLE

(*Scolytus multistriatus*)

**California:** Adults heavy on elms in rural area near Stockton, San Joaquin County for a new county record. **Nebraska:** Heavy in dead elms at Lincoln, Lancaster County.

### RED TURPENTINE BEETLE

(*Dendroctonus valens*)

**California:** Locally heavy in pines at Los Gatos, Santa Clara County.

### A GALL MIDGE

(*Contarinia* sp.)

**California:** Defoliating Douglas fir trees in 6,000-acre stand in Bluff Creek area and 15,000 acres in Red Cap Creek area. Most severely affected are shaded and depressed trees.

### A FALSE SPIDER MITE

(*Brevipalpus pini*)

**California:** Heavy populations reported infesting numerous Monterey pines on Vandenburg Air Force Base, Santa Barbara County.

# Literature you'll want

Here are the latest government, university, and industrial publications of interest to the readers of *Weeds Trees and Turf*. Some can be obtained free of charge, while others are nominally priced. When ordering, include title and catalog number, if any. Sources follow booklet titles.

**How Trees Grow.** Catalog No. A 13.20/3:T 71/2/966, 1966, 21 x 24 in., 20¢, Supt. of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

**Suggested Guide for the Use of Insecticides to Control Insects Affecting Crops, Livestock, Households, Stored Products, and Forest Products.** Agricultural Handbook No. 313, \$1.25, Supt. of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

**Turfgrass Varieties for Colorado.** Pam. 6-S, Colorado State University Extension Service, Ft. Collins, Colo.

**New Chemical for Control of Bluebell, Black Medic and Yarrow in Bluegrass Turf.** Pam. 7-S, Colorado State University Extension Service, Ft. Collins, Colo.

**A Survey of Extent and Cost of Weed Control and Specific Weed Problems.** Publication No. ARS-34-23-1, 78 pp. 1965, Office of Information, U. S. Dept. of Agriculture, Washington, D. C. 20250.

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**TREE BUSINESS and equipment for sale;** high-class clients in desirable area of Westchester County with opportunity to expand; enjoys high reputation of 28 years of repeat clients. Annual gross, approximately \$100,000.00 with a profitable net personal income above \$20,000.00. Inventory of 5 trucks, 2 high-powered sprayers, numerous chain saws, etc. Asking \$40,000.00—\$50,000.00, terms. Owner would stay on for short duration and sell on commission basis if desired. Modern office and warehouse also for sale or option to lease. Write, phone, or visit office of Wade Tree Experts, 107 N. Greeley Ave., Chappaqua, N.Y.

### Western Weedmen To Meet

Regulations, extension, and research reports are on tap for the first two days of the '67 Western Weed Control Conference, set for Mar. 15-17, at the Westward Ho Hotel, Phoenix, Ariz. Industry developments will be covered on Mar. 17. For details, contact conference secretary, K. C. Hamilton, Department of Agronomy, University of Arizona, Tucson, Ariz. 85721.

### Dow Offers Fumigation Book

"Plunder Underground," a 48-page booklet on nematodes and their control, is now being offered by The Dow Chemical Co. Nematode damage, basic fumigation practices, and Dow's soil fumigants are reviewed. Illustrations of fumigation equipment and its application, and several charts are included. Readers can obtain a copy from Merchandising Section, Agricultural and Industrial Bioproducts Sales, Bioproducts Center, The Dow Chemical Co., Midland, Mich.

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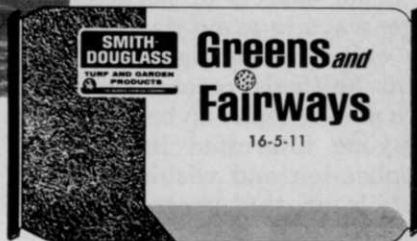
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**James A. Nelson (left)**, editor and publisher of Trade Magazines' WEEDS TREES AND TURF, and **James Milholland, Jr. (right)**, president of Home State Farm Publications, confer after announcing acquisition of TM by Home State. WTT will operate under the Trade Magazines Division of the parent organization, with Nelson continuing as editor and publisher, and also serving as a vice president of Home State Farm Publications, Inc.

### Applicators Meet in Nebr.

A program beamed primarily toward commercial and municipal applicators has been planned for the 3rd annual Nebraska conference on "Selection and Handling of Pesticides," set for April 3 and 4, at the Nebraska Center for Continuing Education, University of Nebraska, East Campus, Lincoln.

Legal aspects of pesticide usage, ways to avoid damage, how to calculate damages, and current pesticide recommendations are among topics to be discussed. Anyone interested in pesticide application and wishing further details on this program should contact J. D. Furrer, Extension Specialist, Pesticide Chemicals, University of Nebraska, East Campus, Lincoln, Nebr. 68503.

### Sodman Becomes Manufacturer

In last month's WTT, Daymon Manufacturing Corp., Gregory, Mich., introduced its new line of specialized equipment for sod producers. Bob Daymon, president of Daymon Manufacturing, says the decision to enter equipment production was based on sod growers' labor problems and cost-price squeeze.

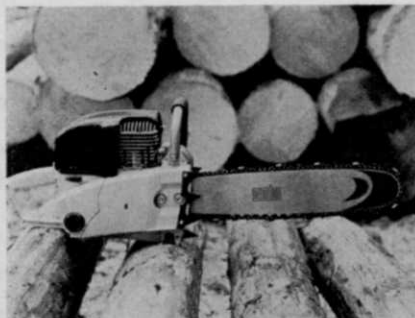
Daymon points out that nearly 30 years of sod experience contributed to the new product line, which is topped off by the Daymon Sod Roller, said to be able to roll up to 1,500 yds. per hour under average conditions. Daymon established its first commercial sod farm in 1938, now owns and operates the mechanization-minded 1,300-acre Emerald Valley Turf Nursery near Fowlerville, Mich.

### Solo 635 Chain Saw Has Increased Cutting Power

Increased cutting power, minimum vibration, and easy starting are said to be features of the new model 635 chain saw from Solo Industries. Design extras include die-cast magnesium casing and hood, the latter readily removable for access to spark plugs, carburetor, and air filter.

Quality carburized steel is used in the crankshaft, which will withstand excessive rotations, Solo says. Aluminum cylinder has a fused-in steel sleeve that can be reground as necessary. Weighing 22 lbs. without bar, 635 has automatic lubrication coupled with a manual hand pump system.

Solo also manufactures the lightweight Combi gasoline engine, now offering 4½ hp. Combi is a detachable unit that can be used to power several equipment items interchangeably, including chain saw, lawnmower, garden tiller, water pump, and outboard motor. Further data on these products is available from Solo Industries, Inc., 5100 Chestnut Ave., P. O. Box 1728, Newport News, Va. 23606.



**Solo 635 chain saw** weighs 22 lbs. without bar, which is available in 17, 21, and 25-in. sizes. Hood and casing are magnesium.

## Trimmings

**Of mice and miscellany.** We were sitting in the front row of the Commodore Hotel's East Ballroom, in New York City, during the opening session of this year's Northeastern Weed Control Conference. The speaker was Rutgers entomologist, Dr. B. R. Wilson. The room wasn't crowded near the front, it being a human characteristic to avoid front rows wherever people gather, so we may have trouble gaining corroboration for this mouse tale. But there it was—peeping from under the speakers' platform at the august assembly of weed controllers: one small wide-eyed gray mouse. Apparently, the mouse decided it was all right to venture out on the theory that a roomful of weed experts wasn't interested in a single rodent. Another look around. Pause. Discovery of entomologists and pest controllers in the audience. And a very hasty retreat.

Exit mouse, and there are more than a few vegetation maintenance men around who wish all rodents would beat such a hasty retreat. It seems to be the season for rodent damage to trees and shrubs. As Richard Crumm, Hoosier entomologist, points out, "rodents cause more damage when snow covers their food supply." Thiram fungicide, brushed or sprayed on plants, "can often turn the rodents' attention to other less important food," he suggests.

Second thoughts on above notes: Mention of the solitary gray mouse is not intended as a reflection on the Commodore Hotel. Indeed, NEWCC's host hotel was most cooperative to visiting weedmen, and Northeast controllers decided before the meeting was out to hold their '68 conference there, too. We hope the mouse will be back next year. But probably the shock was too much for it.

\* \* \*

**Congratulations to the new Mid-Continent Weed Control Association, to Al Price, Ralph Reid, John Lehr, Dick Evans, Tom Graham, and company.** The need for applicators to band together for the protection of their legitimate interests has never been more apparent.

\* \* \*

**Travelling Tifdwarf.** Received an invitation to attend the opening of the new Kauai Surf Golf and Country Club, in Hawaii of course. Deeply regret that our jampacked travel schedule prevents us from attending any but winter meetings held in northern latitudes and summer meetings in southern latitudes. We don't know why it works out that way, but it always seems to. If there's a winter turf conference in the Aleutian Islands next year, it will probably show up on our schedule. Remarkable thing about the Kauai course is that it's ready for play, when the greens were sprigged with Tifdwarf bermudagrass just last October. First time for this popular new grass variety in Hawaii. It took Cal-Turf's new Hawaii operation more than a year to ready the grass for the Kauai greens. Now everything is set for surfside putters. Happy putting out there...

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SP67-2



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