

**Special
Conference
Issue**

WEEDS TREES and TURF

FORMERLY WEEDS AND TURF

February 1965



TURFGRASS

FEB. 7-12

AQUATICS

FEB. 9-10

ARBORISTS

FEB. 14-16

Mascaro Reviews Turf Renovation . . . 8

How to Diagnose Tree Root Diseases . 12

New Tools To Fight Aquatic Weeds . . . 18

KEEP GRASS GREEN

WITH

V-C[®] 13

KILLS NEMATODES AND CHINCH BUGS

V-C 13 is the ideal liquid product to use to protect turf from nematodes and chinch bugs. Nematodes are tiny, thread-like worms that attack grass roots and stunt or ruin growth. Fertilizer, water and good care are wasted when nematodes wreck grass roots. Chinch bugs are death on green grass. They actually suck the life out of grass stems. The grass turns yellow and then brown, as it dies. V-C 13 is a practical, easy way to destroy nematodes and chinch bugs. It provides powerful, long-lasting

control of these destructive pests. And V-C 13 is safer to use, lower in toxicity than chlorinated hydrocarbon preparations. It's easy to keep grass green with V-C 13. Get it from your supplier or write to the address below for full information.



V-C Chemical Company

A DIVISION OF SOCONY MOBIL OIL COMPANY, INC.

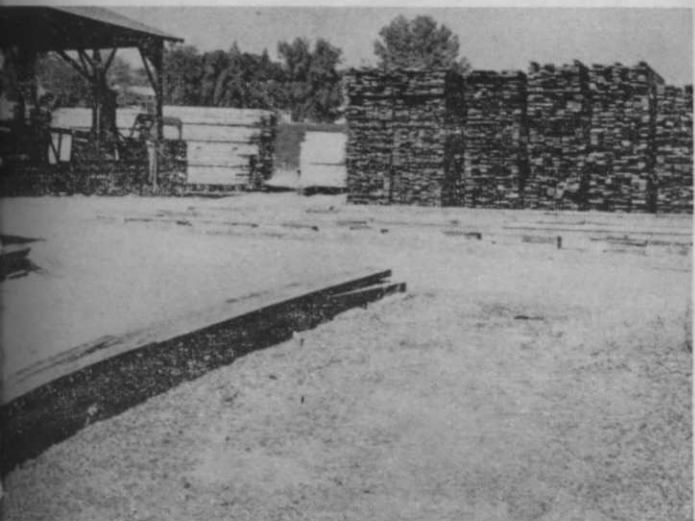
401 East Main Street • Richmond, Virginia 23208 • Phone: 648-0111



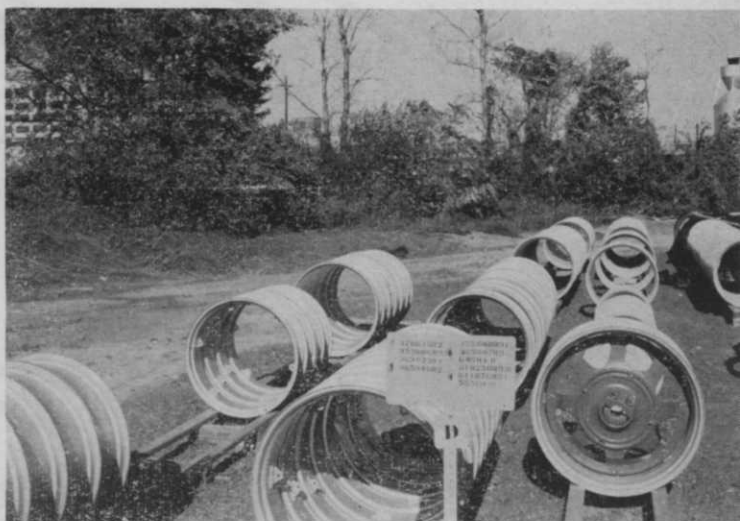
Control hard-to-kill perennial and annual weeds and grasses with new Hyvar® X-WS bromacil weed killer. Vegetation in the foreground and to the left above was effectively controlled with one application of "Hyvar" X-WS; area in right background was not treated. Maintenance cost is reduced by using long-lasting, effective "Hyvar" X-WS.



Easy-to-use "Hyvar" X-WS controlled weeds and grasses around the fence line. Once stirred into solution "Hyvar" X-WS doesn't require additional mixing or agitation. It's easily applied with simple equipment such as knapsack type sprayers. Expensive hand clipping is eliminated when you use "Hyvar" X-WS.



Fire-hazardous vegetation was controlled with Hyvar® X bromacil weed killer in the lumber yard area above. "Hyvar" X is a wetttable powder formulation for use in sprayers equipped with adequate agitation. After application "Hyvar" X gives the same effective control as new "Hyvar" X-WS. All Du Pont weed killers are non-volatile, non-flammable, non-corrosive and low in toxicity to man and animals when used as directed.



Moisture-holding vegetation that tends to rust expensive equipment was controlled here with Karmex® diuron weed killer. "Karmex" is a versatile weed killer that gives long-lasting economical control of unwanted vegetation. By removing undesirable weeds and grasses in storage and other areas with "Karmex," employees' working conditions are improved and tool and material losses are decreased.

WEEDS!

A menace to everyone/profits for you

There's money in weeds, if you're on the right side of them. Du Pont weed killers make custom weed control jobs easy, effective and profitable for you. Check the typical problems pictured above. Chances are you'll see similar ones within a mile of where you're standing, and that you can solve them with Du Pont weed killers.

In addition to weed control, Du Pont Ammate® X weed and brush killer and Dybar® fenuron weed and brush killer offer your customers effective brush control. "Ammate" X is non-volatile... brush near crops or desirable plants may be sprayed without harmful fume damage when it's used as directed. On light-to-medium stands of brush, easy-to-use pellets of "Dybar," applied right from the package, do an effective job. For complete information, mail the coupon to Du Pont today.

On all chemicals, follow labeling instructions and warnings carefully.



WEED & BRUSH KILLERS

Better Things for Better Living...through Chemistry

Du Pont—Industrial and Biochemicals Department
Room 2311
Wilmington, Delaware 19898

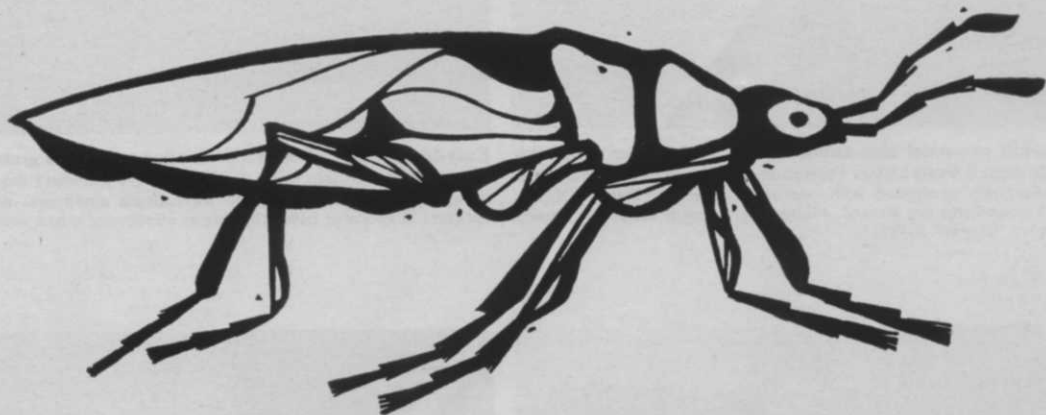
Please send me more information on Du Pont Weed and Brush Killers.

Name _____

Company _____

Address _____

City _____ State _____ Zip Code _____



Here today...



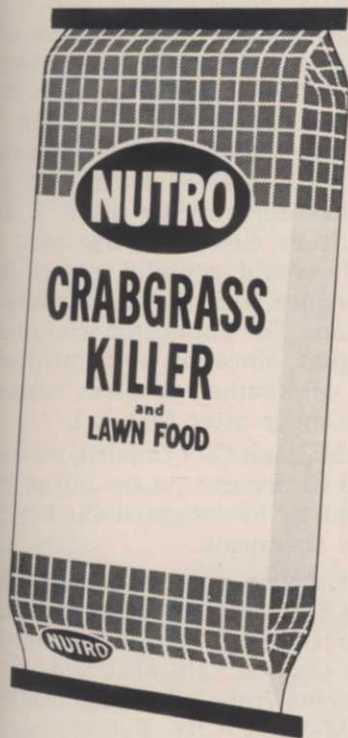
...goner tomorrow

Ethion kills chinch bugs . . . ends destruction to lawns, parks and fairways. Ounce-for-ounce no pesticide outperforms it. Tests show just one application gives outstanding results and provides total control. And Ethion is easy-to-use, safe, economical, long lasting. U.S.D.A.-approved to curb sod webworms, halt mites in Bermuda grass, too. Write or call your supplier today for details.



TECHNICAL CHEMICALS DEPT., NIAGARA CHEMICALS DIVISION, MIDDLEPORT, NEW YORK

KILL CRABGRASS BEFORE YOU SEE IT!



- 1 kills crabgrass
- 2 feeds grass
- 3 kills insects

Triple-acting to end lawn headaches in one easy application. Kills crabgrass when it sprouts. Contains Dacthal for pre-emergence control. Packed with fast-acting, long-lasting nitrogen to green-up grass in a hurry and keep it that way. Triple-acting Nutro Crabgrass Killer kills insects, too . . . eliminates chiggers, ants, grubs and other pests.

A product of SMITH-DOUGLASS

WEEDS TREES and TURF

FORMERLY WEEDS AND TURF

February 1965
Volume 4, No. 2

Features:

Tom Mascaro's Guide to Turfgrass Renovation.....	8
New Crabgrass, Brush Control Concepts Bow at 20th North Central Weed Control Conference, Dec. 14-16.....	10
How to Diagnose Shade Tree Root Diseases By Dr. P. L. Rusden.....	12
Turfgrass Portraits VIII: Centipedegrass By Dr. Robert W. Schery.....	16
New Ways to Apply Aquatic Herbicides.....	18
Broadened Industrial Sessions Underscore Importance of Nonfarm Weed Control at 19th Northeastern Weed Meet.....	26
Experts at Virginia Conference Dec. 8-10 List Fungicides, Insecticides for 200 Delegates By F. H. Titlow.....	34
New Antidrought Compounds for Turf Examined During New England Agricultural Chemicals Conference, Dec. 9-10.....	34

Departments:

Editorial: Not Fair to Midland.....	6
Know Your Species: Jimson Weed.....	24
Meeting Dates	32
Classified Ads	36
Advertisers Index	36
Trimmings	38

JAMES A. NELSON
Publisher

CHARLES D. WEBB
Editor

DAVID E. SCHNEIDER
Staff Biologist

D. BUNKIN
Circulation Supervisor

Advertising Representatives
National Headquarters
1900 Euclid Avenue
Cleveland, Ohio 44115
Phone: Area Code 216+771-4169

New York City
Billingslea & Ficke
420 Lexington Avenue
Phone: 212+532-1632

Chicago
Peck & Billingslea, Inc.
185 North Wabash Ave., Suite 1809
Phone: 312+DEarborn 2-0292-93

West Coast
The Maurice A. Kimball Co., Inc.
Los Angeles: 2550 Beverly Blvd.
Phone: 213+DUnkirk 8-6178
San Francisco: 580 Market Street
Phone: 415+EXbrook 2-3365

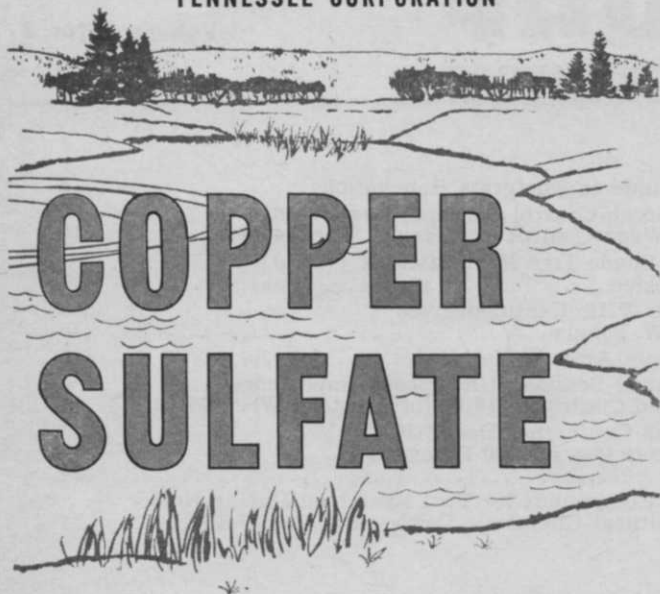
WEEDS TREES AND TURF is published monthly by Trade Magazines, Inc. Executive, editorial, and advertising offices: 1900 Euclid Ave., Cleveland, Ohio 44115. Publication office: Corner of East North St. and Cadwallader St., Fostoria, Ohio. Send all correspondence to WEEDS TREES AND TURF, 1900 Euclid Ave., Cleveland, Ohio 44115.

Single Copy Price: 50 cents for current issue; all back issues 75 cents each. Foreign \$1.00.
Subscription Rates: U.S. and possessions, 1 year \$3.00; 2 years \$5.00. All other foreign subscriptions, 1 year \$4.00; 2 years \$7.00. **Change of Address:** Three weeks advance notice is necessary for change of address. Both old and new address must be given. Post Office will not forward copies. Third Class postage is paid at Fostoria, Ohio.

Contents of this Issue © Trade Magazines, Inc., 1965



TENNESSEE CORPORATION



COPPER SULFATE

**For control of algae,
microorganisms and fungi.**

READILY AVAILABLE IN ALL CRYSTAL SIZES

- **Large Crystals**
- **Medium Crystals**
- **Granular Crystals**
- **Snow Crystals**
- **Powdered** —instant dissolving

For your free booklet on the use of Copper Sulfate in this application, a quotation or the name of your nearby distributor, contact



INDUSTRIAL CHEMICALS MARKETING DIVISION
TENNESSEE CORPORATION

44 BROAD, ATLANTA, GEORGIA 30303
PHONE (404) 523-5024

Not Fair to Midland

We had a telephone call recently from a contract applicator in Midland, Michigan, who was disturbed about a proposed city ordinance, apparently on the verge of enactment, which would:

(1) permit spraying elm trees for control of Dutch elm disease "with effective pesticides such as DDT and methoxychlor" only during the dormant period, which was in turn defined as "that period in the autumn when the elm tree has shed at least 95% of its leaves until March 1st of the following year;"

(2) permit spraying for any purpose during all other times *provided that* sprays contain no DDT, TDE, methoxychlor, chlordane, dieldrin, toxaphene, aldrin, BHC, endrin, or lindane.

While it is probable that the legislators who were about to pass the law meant well, it seems to us such legislation is not in order until specific proof of harm from summer spraying can be demonstrated. As most vegetation maintenance professionals know well, these chemicals are, and have been, under close scrutiny by the U. S. Department of Agriculture, but there has been no label change which would prohibit use of the chemicals (in accordance with the label itself) in the period in question. The applicator who called us was naturally upset, since, as he pointed out, frequently because of weather or other reasons, the applicator must spray after March 1.

Fortunately, the Midland City Council, we were informed, postponed its decision on the bill so that the proposition could be investigated further before prohibiting the chemicals.

The decision to postpone action was, we understand, partly a result of the efforts of the applicator who phoned us, requesting our opinion by wire for presentation to the Council. He also told us he had obtained statements from other organizations which hoped the Midland City Fathers would hold off their vote until methodical, unimpassioned investigation could be carried out. This action by an industryman is commendable, and we urge our other readers to be sure to speak up should local authorities threaten to ban, without thoroughly understanding the facts, the chemicals which are used frequently for contract spraying.

Any action other than postponement on the part of the Council would have been unfair to Midland, and the residents there who have a right to the most effective safe control of vegetation pests currently available.

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.

FACTS
about
HYDRO-MULCHING

...the new one-step
 method for establishing turf

Authoritative source material for this booklet was obtained through the kind cooperation of leading university agronomists, forestry services and fiber mulch experimental research.

GET THIS
 AUTHORITATIVE
 NEW BOOKLET

FREE

Explains how Hydro-Mulching provides better quick-turfing for highways and public works, parks, reforestation, golf courses, homes, landscaping, everywhere grass is needed.

★
 HERE AT LAST
 IS EVERYTHING
 YOU NEED TO
 KNOW ABOUT THE
**ONE-STEP
 METHOD OF
 TURFING!**



FOREST BURN-OFF

GOLF COURSE

HIGHWAY PARK

LAWNS

NOW YOU CAN HAVE
FAST TURF — BETTER TURF
at low... low cost!

Published exclusively by

BOWIE MACHINE WORKS
 BOWIE, TEXAS

Bowie Machine Works, Inc., Bowie, Texas

PLEASE SEND ME THIS AUTHORITATIVE FREE
 BOOK ON HYDRO-MULCHING.

NAME _____

BUSINESS _____ TITLE _____

ADDRESS _____

CITY _____ STATE _____



Tom Mascaro

Tom Mascaro's Guide to Turfgrass Renovation

RENOVATION is a term used by turfgrass managers to describe a process or program of renewal of a turfgrass area. Generally speaking, renovation can be classified into three categories. These categories simply represent degrees of intensity of renovation.

1. *Complete renovation* is performed when a turfgrass area has deteriorated so badly that the existing vegetation is not worth saving.

2. *Fall renovation* helps turfgrass that needs rejuvenation after a season's intensive use. Such areas still have reasonably good turf but need to be renovated to insure continued growth.

3. The third form of renovation is really *management*. This type of renovation is set up on a continuing basis, keeping up with the problems as they occur.

Before we get into a discussion of these three forms, we should analyze why renovation is necessary at all.

Turfgrass areas are subjected to many forces which are contrary to normal grass growth. Usually, turfgrass plots deteriorate because of the lack of a complete maintenance program. Everything must be in balance. Adverse weather, disease, and overuse are also factors which contribute to turfgrass deterioration. One of the major factors adversely affecting turf is soil compaction. We pound and compact the soil with heavy mowing equipment. We ride over it and we stomp the soil with our feet. We use the areas when the ground is wet, and we puddle the soil. These compacting forces destroy soil structure, reducing it to a solid mass. Roots cannot grow in a soil unless there are spaces for them to move through. Water cannot penetrate a compacted soil. Fertilizer remains on the surface and is washed away.

When soils are compacted under turfgrass areas, the root system becomes shallow, and the plants become weak.

Weeds gradually take over. Many weeds are by nature more aggressive than turfgrasses and

can grow in a compacted soil. However, even weeds cannot grow when soil becomes severely compacted. When weeds are present, they should be looked upon as indication that something is basically wrong. Getting rid of the weeds is not a solution to the problem, unless the cause itself is corrected.

Generally speaking, there are five basic reasons why a turfgrass area deteriorates and is invaded by weeds. They are: 1. *the soil*; 2. *the grass*; 3. *the nutrition*; 4. *the water*; 5. *the management program itself*.

The soil must be open and porous. The grass should be the right one for the climatic area and use. The nutrition should be adequate to support the crop. The water should be adequate to sustain plant requirements, neither too much nor too little. The management program should be properly planned to maintain the turf at all times.

Any one or a combination of these factors that are not right will weaken a stand of turfgrasses. Therefore, before renovation is begun, turf managers must seek out the basic causes of deterioration. Only after this has been done should a program of renovation be initiated.

Complete Renovation

When a turfgrass stand is in extremely poor condition and what little turf that is there is not worth saving, then a complete renovation program should be considered. Sodium arsenite or an equivalent material is applied about one week prior to aerification. Usual rate of sodium arsenite is about 35 pounds per acre. This material will kill the existing vegetation. A week later, the aerator, equipped with 1-inch open spoons, is set at full depth, and the area is aerified at least 10 times. Each time the plot should be aerified from a different direction. Aerification will loosen the soil 3 to 4 inches deep. After aerification, the required amount of fertilizer (and lime if needed) is applied. This is followed by dragging with a heavy flexible-

tine harrow or a large section of chain-link fence. This operation will crumble the soil cores brought up by the aerator and thoroughly mix the fertilizer with the soil. This is followed by seeding or sprigging. The area is lightly rolled and, where possible, kept moist until the grass is established. Since sodium arsenite is a contact killer and primarily destroys the living vegetation, it might also be desirable to use a preemergence chemical for crabgrass or other local weeds that may be a problem. County agricultural agents may be consulted for specific information and recommendations.

Fall Renovation

Fall renovation is performed in the early fall. It is practical to renew or rejuvenate turfgrass plantings that have been abused but are still in reasonably good shape.

If weeds are present, specific chemicals should be used to eradicate them. This is then followed with thorough aerification, three to six times over the area. Fertilizer is applied, and the area is dragged to pulverize the soil cores.

Fall renovation is a general practice on many turfgrass tracts. Since roots grow best in the fall and early spring, loosened soil and fertilizer are necessary to encourage plenty of root growth during this period.

Renovation as a Part Of Management Programs

This is more management than renovation, but falls within the general concept of renovation. One way to describe this type of renovation is to say that we keep up with turfgrass problems as they occur.

Instead of renovating once a year, the turfgrass areas are managed on a continuing basis. Soil compaction is eliminated as it forms. Fertilizer is applied as the plants require it. Weed control materials are applied when weeds first appear. Each of these operations is carried out in a modified way so that turfgrass is never materially disturbed. A management program such as

this is highly desirable. With good planning, these procedures can be worked into a regular routine. True, these operations require more manpower, but when carefully analyzed, we usually find that we have spread this manpower requirement throughout the growing season, rather than requiring a concentrated effort at one time.

Regardless of the type of renovation you choose, always remember to check the five points we discussed earlier in this article. When renovation is necessary, you can be sure that something went wrong. Was the soil compacted or not properly drained? Was it the right grass for your region and use? Was nutrition adequate for the grass? Was the area continually overwatered? Was the turf managed properly, with correct mowing height and frequency of cut?

Too Much Grass?

If the management program is successful, then you must be prepared for another problem.

This problem is *too much* grass. Well-managed turfgrass can produce an excessive amount of top growth which develops into what is commonly called thatch. This material consists of clippings, dead leaves of grass plants, and stems. As this material accumulates on the surface of the ground and under the living grass blades, it forms a thatch layer. This layer can effectively prevent water from penetrating to the soil; it filters

out fertilizer and harbors disease organisms. When thatch accumulates, it must be removed or decomposed. A regular program of aerification will bring up soil cores, which when crumbled act as a top dressing. When this soil is in intimate contact with accumulated thatch, it helps it to decompose. Vertical mowers are also used to remove thatch physically. These machines, unlike conventional mowers, cut vertically into the turf, rapidly removing the dead material.

On turfgrass plots where renovation is needed, vertical mowing is necessary if excess thatch is present. For complete renovation, the dead turf, after chemical treatment, is completely removed by this process, which in turn is followed with aerification.

For fall renovation, the vertical blades are set two to three inches apart to remove some of the accumulated thatch. Vertical mowing in a management program is effected periodically, while grass is actively growing, to control thatch as it forms.

Modern chemicals and equipment have made renovation a great deal easier than it was in the past. This operation can now be done with reasonable assurance of success. Modern turfgrass management, obviously, is a science. Anyone charged with this responsibility should become familiar with each new technique in order to produce top quality turf.

Turf renovation through use of aerators, vertical mowers, etc., while once largely limited to golf courses, has now become a common practice in other fine turf areas, including lawns maintained by contract by private service firms. In this article, author Mascaro discusses the general principles of this process. His observations will be invaluable to the novice, and helpful as a review to the expert. Mr. Mascaro is president of West Point Products.

New Crabgrass, Brush Control Concepts Bow at 20th North Central Weed Control Conference, Dec. 14-16

Delegates to the 20th North Central Weed Control Conference at Michigan State University were introduced to the first really new crabgrass control compound to be developed since the advent of organic preemergence materials. Michigan State hosted the annual event at its Kellogg Center for Continuing Education on the East Lansing campus Dec. 14-16.

The race is on, too, for a no-drift weed and brush control chemical which can be applied safely from the air, delegates learned. Several companies previewed or reviewed their wares which range from heavy materials applied with special equipment to liquids which solidify on contact with plants.

Techniques for industrial and rights-of-way weed and brush control were freely aired. Conferencees were pelted time and again with the idea that control efforts must be programmed and planned well in advance for best results. There is no cure-all chemical which will control all weeds in all climates, during all seasons, under any conceivable conditions.

Year by year weed conference agendas have included more and more nonagricultural weed control techniques. The volume of commercial pursuits was evident at this 20th NCWCC meeting since the programmers rearranged the schedule so that con-

current meetings could be easily chosen for those not involved in agriculture, and the 329 delegates budgeted their time and managed to make all sessions in their particular disciplines.

Product Previews

Perhaps the most exciting session of the first day's program was the "New Products from Industry" presentation, if one can count on the reaction of delegates as an indicator.

A product which especially stirred conferees was DuPont's new selective preemergence herbicide, Tupersan. Mark B. Weed of DuPont's Experiment Station described the soon-to-be-marketed product.

"An outstanding feature of Tupersan's active ingredient, 1-(2-methylcyclohexyl)-3-phenylurea, is its selective ability to eliminate certain annual seedling grasses from stands of other grasses," Weed began.

He showed slides which illustrated that Tupersan had selectively removed smooth and hairy crabgrass from Kentucky bluegrass plots. Uniquely, Tupersan is applied at the time of seeding, when a new bluegrass lawn is planted.

"Bluegrass, red fescue, and bentgrass seeds have germinated and grown in soil containing eight times the recommended dose for annual grass control," Weed explained. In addition to



Highly respected for his knowledge and opinions, Dr. F. L. Timmons (right), Aquatic Weed Investigations Leader with USDA, Laramie, Wyo., willingly shares his experiences with cottail with Philip Marvin, agricultural consultant from Manhattan, Kansas.

the crabgrasses, Tupersan is claimed to remove foxtails, downy brome, barnyard grass, witchgrass, and nimblewill from a number of cereal grains and from turf, when applied before weed or grass germination at planting time.

A 50% wettable powder formulation, called Tupersan Weed Killer, will be sold early in '65.

Among other products of interest to *WTT* readers are Maintain and Hibor, just released by U. S. Borax and Chemical Corp., Los Angeles, Calif. J. T. Hallett of U. S. Borax Research introduced the products.

"Maintain is an emulsifiable compound containing Tritac, bromacil, and a low-volatile 2,4-D ester," Hallett began. "It is designed to control grasses, annual broadleaves, deep-rooted perennials, and vine species around industrial sites for extended periods." Maintain is claimed to offer quick knockdown of broadleaf weeds and season-plus control of hard-to-kill species.

Hallett also described Hibor, Borax's new ready-to-spray herbicide designed primarily for railroad use. Hibor consists of a combination of sodium chlorate, sodium metaborate, and bromacil. Again, Hallett indicated the combination would give rapid knockdown and a significant residual. "Hibor is sold in tank-car quantities and is a useful herbi-

(Continued on page 20)



Longtime Conference supporters, C. E. Stower (right) and W. C. Reed (center), both with Slayton Agricultural Chemical in Wisconsin discuss the years' changes with conference secretary, G. Clare Buskirk.



Geigy herbicides produce dead weeds and new business

There are untapped profit opportunities for you in the field of chemical weed control. Geigy herbicides enable you to realize this potential because of product superiority: a single spray works through the entire season to control most annual broadleaf weeds and grasses.

Results the easy, economical way

With Atrazine 80W or Simazine 80W, you give your clients weed control they can count on. You make one application of Atrazine before weeds are up or shortly thereafter, or spray Simazine before weeds break ground. Rainfall carries either herbicide to the weed root zone where it is picked up by germinating weeds. Weeds die soon after emergence. And, as later weeds germinate they are killed as well. No continuing control problem . . . no repeat sprays for you to put on.

Every job an advertisement for you

At every type of installation where weeds are a problem—industrial, commercial, institutional, roadside—the results of your work are seen and noticed. New business will be referred to you, as the weeds you have sprayed continue to be controlled by Geigy herbicides.


Safety added to effectiveness

Geigy herbicides, used according to label directions, deliver outstanding weed control, coupled with safety to humans and animals. Nonirritating to the skin and noncorrosive to equipment, Atrazine and Simazine can be removed from tanks and lines by flushing with plain water.

Valued service

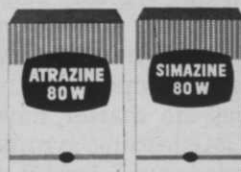
Weed control, like pest control, is a professional specialty, requiring "know-how" in choice of material as well as application technique. Select the right Geigy herbicide to solve each weed control problem, and you perform a valued individual and community service . . . one which will bring

you profitable returns. For full details on highly effective weed control write to:

Geigy Agricultural Chemicals, Division of Geigy Chemical Corporation, Saw Mill River Road, Ardsley, N. Y. 



Geigy
CREATORS OF CHEMICALS FOR MODERN AGRICULTURE
Atrazine | Simazine



How to Diagnose Shade Tree Root Diseases

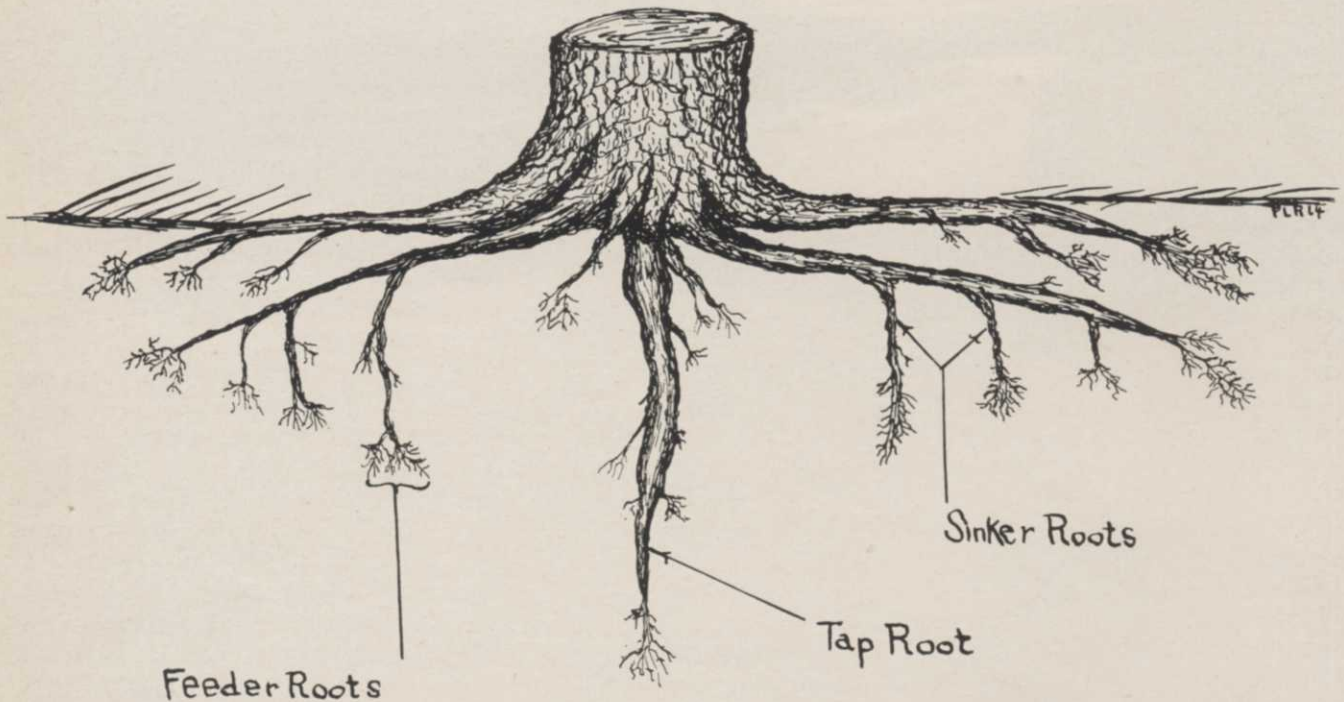


Diagram of typical pine roots. Much remains to be learned about diagnosing root diseases, author Rusden says, so tree specialists must exercise diligence in using all available data to help spot the trouble.

DIAGNOSIS of tree diseases affecting the visible, above-ground parts of a shade tree is not easy. But it is a "pushover" compared with diagnosis of root troubles. A good diagnostician must know the normal tree and its requirements. He must identify the species correctly, recognize the growth zone to which it is adapted, evaluate the form, foliage density, size, and color. He should look for "normalcy" clues in the growth rate of twigs.

Quite a list of questions must be answered satisfactorily with regard to soil, site, exposure, drainage, temperature ranges, insolation, and general ecology of the typical "happy" tree. A probable condition of disease will be indicated when one or more signs point to abnormalities, no matter how slight.

Misleading symptoms must be ruled out. Dwarf varieties are

By DR. PHILIP L. RUSDEN

Chief Pathologist
Bartlett Tree Research Laboratories
Stamford, Connecticut

not necessarily "sick." They are just small because of genetic factors. Variegated forms of ash or maple, for example, should not be suspected of pathological chlorosis. Some trees come into leaf late and/or shed foliage early because of genetic aberrations. Observations made in a single season may not reveal the basis for this kind of odd behavior.

Above-ground symptoms of trouble may be secondary. Primary causes may well be subterranean—out of sight. Out of mind, too, for the investigator who is untrained or simply drowsy!

When we would like, literally, to get to the root of the matter

we may be stymied. The soil-penetrating, root-revealing X-ray machine has yet to be invented. In ignorance of what may lie below the soil, there is a temptation to speculate as to possibilities. Rachel Carson doled out *possibilities* with a free pen. Scientists, on the other hand, deal with *probabilities* based upon recurrence of carefully observed phenomena. It is *possible* that the tree on a dry site is drowning from a water pocket at its roots. It is *probable*, however, that it is suffering from drought since thousands of trees on really dry sites have been seen to be prime sufferers from drought.

Root Knowledge Scant

What do we know about the normal root system of a mature tree? Even professional botanists do not pretend to identify woody

plants from root specimens. In most instances, it is just too much of a chore to examine root systems through layers of mud, silt, clay, loam, gravel, and rocks. Many professional tree men spend their whole lives without ever having dissected out the entire root system of one mature tree. Our knowledge of roots, their functions and their ailments, is based on hundreds of bits and pieces of information acquired through the years. It is small wonder that our knowledge of the normal root system is sketchy. It follows that our store of root-disease know-how is relatively scanty. On the other hand, we do have a vast storehouse of knowledge of the complex soil fauna and flora, the thousands of microscopic and macroscopic animals and plants that spend their lives in the soil in intimate association with tree roots.

Roots grow in soil. Soil consists variously of inorganic and organic particles of all shapes and sizes from iron oxide molecules to boulders, intermingled with water, air, and odds and ends of gases. In general, tree roots do well in good soil and not so well in poor soil. This is not the place to discuss the chemico-physical qualities of soils in detail. Suffice it to say that faulty soils are the basis for many root diseases. Indeed, diseases in the form of physiological imbalance are much more common than infectious diseases due to specific

organisms. Very small changes in temperature or moisture in roots can lead to trouble. The greater the relative change, the more obvious the source of such trouble becomes.

Tree roots must have *enough* soil in which to grow by normal

It's hard enough, author Rusden says, to diagnose tree diseases affecting the above-ground portions of a tree; but root diseases are even more perplexing. In this article, Bartlett's expert pathologist offers for treemen everywhere some inside tips on root care.

cell proliferation. The root system of a tree is roughly proportional to the crown or system of branches. Confine the roots and you automatically reduce the size of the crown. A layer of clay hardpan or a rock ledge just below the upper soil "horizon" can have this root-reducing confining effect.

Roots of most trees need a granular soil in which the particles are relatively small. And a high proportion of the soil com-

ponents must be nutritious—must consist of water-soluble minerals to yield the N, P, K, S, Cu, Fe, Mo, C, and other elements that are sent up in the sap stream to the photosynthesis factories in the foliage.

Insufficient or improper chemicals in the soil may cause the death of some roots. Water is needed to dissolve the chemicals if they are to be taken up by roots. Lack of water, i.e., drought, kills by desiccation. Excess water kills by drowning, a form of asphyxiation.

Dead Roots Invite Attack

Once dead, a group of roots are subject to attack by saprophytic bacteria and fungi. Some of these, once they are established, may become active parasites and go on to kill more roots. Large roots and even the trunk of the tree are attacked. The entire tree may be nearly dead before signs of trouble are visible in the crown.

Infection courts are often the result of mechanical damage. Windstorms can sway the crown enough to break roots. Excessive cultivation of flower beds near trees can break roots. Heavy machinery passing over the soil in which roots are growing not only compacts the soil unduly but actually fractures many roots. Digging away of soil in highway and building construction exposes thousands of roots to desiccation and infection. Bacteria and fungi are always

Bacterial crown galls, like the one shown here on the root of a willow tree, are typical results of the diseases Dr. Rusden discusses in this article.



This wood-rotting fungus, *Polyporus frondosus*, is one of many ailments tree service personnel must guard against. This growth is fruiting at the base of a large pin oak tree.





KILL WEEDS

KEEP FISH

in sport
LAKES or PONDS

Aquathol aquatic weed killers offer these distinct advantages when used as directed:

- NOT HARMFUL TO FISH, fowl or aquatic animal life.
- LEAVE WATER USABLE FOR swimming, fishing and boating.
- EFFECTIVE AND FAST ACTING for complete lake or spot treatment.
- AQUATHOL PLUS CONTROLS 25 WEED SPECIES easy and non-hazardous to apply.

for control of nuisance weeds, specify

AQUATHOL®

PENNSALT

CHEMICALS • EQUIPMENT
Department WT

309 Graham Bldg., Aurora, Ill.
P. O. Box 153, Bryan, Texas
3239 Mayfair Blvd., Fresno, Calif.
P. O. Box 1470, Montgomery, Ala.
2901 Taylor Way, Tacoma, Wash.

Please send me your new brochure on aquatic weed control. I'm interested in treating:

Pond Lake Dock or Beach Area
Approximate size of area to be treated

Name _____
Address _____
City _____ Zone _____ State _____



Nematodes, known scourges of lawns, also attack trees. The nodules shown here on roots of an oak tree are nematode-induced.

present in the soil ready to avail themselves of any breaks in the protective cortex of the roots. Once started, root rot is likely to continue.

Poisonous chemicals introduced into the soil are oftentimes directly harmful. Road salt (Na Cl or Ca Cl₂) may accumulate where drainage is poor. Roots are killed even though very slowly in most cases. Chemical waste from factories, natural or manufactured gas from leaking mains, and methane from rotting vegetation can kill roots.

Trees planted too far north (or south) of the zone to which the species is adapted will die. Trees improperly planted will often develop girdling roots that will strangle other roots and even cut off sap movement in the trunk. Planted too deep, roots will smother; too shallow, roots will freeze in winter or bake to death in summer.

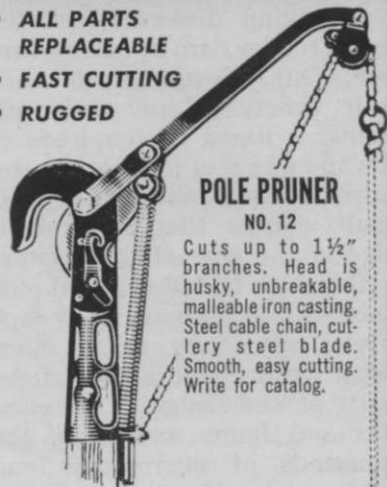
Root Enemies Abound

A growing tree root not only meets mechanical and chemical barriers. It meets active enemies in the form of chewing rodents, digging dogs, grubbing humans, boring insects, cell-penetrating nematodes, noxious bacteria, rotting fungi, and occasional higher plant parasites such as *Monotropa*. Viruses, such as the

(Continued on page 32)

Professional Tree Pruners

- ALL PARTS REPLACEABLE
- FAST CUTTING
- RUGGED



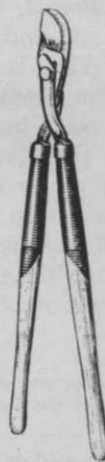
POLE PRUNER NO. 12

Cuts up to 1½" branches. Head is husky, unbreakable, malleable iron casting. Steel cable chain, cutlery steel blade. Smooth, easy cutting. Write for catalog.



NO. 11

Cuts up to 1" branches. Malleable iron head. Steel cable chain, cutlery steel blade. Smooth, easy cutting. Write for catalog.



LOPPING SHEARS NO. 75

Heavy duty; fast, easy cutting compound lever loppers designed for utility use. Cuts up to 2" branches. Full line of loppers.



PRUNING SAWS NO. 1826

26" Sandvik Swedish steel blade. A professional saw. Full line of saws.

Quality Tools
SEYMOUR SMITH
Since 1850

Send for complete catalog and prices.

SEYMOUR SMITH & SON, INC.
Oakville, Conn., U. S. A.
Sales Representatives
JOHN H. GRAHAM & CO., INC.
105 Duane St., New York 8, N. Y.



Good Neighbors

...when **SEVIN**[®] insecticide is used
CARBARYL INSECTICIDE

The problem of insecticide residues...

has continued to perplex property owners and commercial operators who control insect pests of turf and plants. *Now many of these worries vanish* for growers who use the modern, proved SEVIN[®] carbaryl insecticide to control any of 160 insect pests that attack turf and other ornamental and crop plants.

Safer to handle...

than many other insecticides, SEVIN is lower in toxicity to humans, livestock and wildlife, including fish and fowl. You need no special protective clothing when you apply SEVIN. Just use normal precautions. You can spray or dust crops adjacent to homes, fish ponds or streams.

Residues in the soil...

are another hazard you eliminate by using SEVIN insecticide. Long-lasting as a crop protector, SEVIN breaks down quickly in the soil. There is no residue buildup to be picked up by garden fruits or vegetables, or to seep into streams or ponds.

Residue on food...

or feed crops is no problem when label directions are followed. SEVIN is a long-lasting insect destroyer that controls these pests with relatively few applications per season. Though still effective against insects at harvest time, the residue of SEVIN insecticide is not a problem to humans or livestock that eat the crops.

Drift to pastures or feed crops...

does not contaminate the milk, meat or eggs of animals eating the feed or forage, when SEVIN is the insecticide used. In fact, cattle can graze pastures, or forage can be harvested, on the day of application of SEVIN.

You can be a good neighbor...

and reduce hazards for everyone while you control insect pests with SEVIN. Ask your nearby supplier for the new list of recommended uses. Or write Union Carbide Agricultural Chemicals, 270 Park Avenue, New York, N.Y. 10017.

SEVIN is the registered trade mark of
Union Carbide Corporation for carbaryl insecticide

**UNION
CARBIDE**

AGRICULTURAL CHEMICALS

Turfgrass Portraits VIII:

Centipedegrass

By DR. ROBERT W. SCHERY

Director, The Lawn Institute

Marysville, Ohio

This is the eighth in a series of nine articles on the basic traits and maintenance procedures for common turfgrasses. Next month author Schery discusses *st. augustinegrass*.

OF THE TURFGRASSES in our "Portrait" series, centipedegrass or "Chinese lawngrass," *Eremochloa ophiuroides*, is perhaps the most enigmatic. It has many qualities of a world beater, then erratically goes to pot because of seeming trifles (viz. minor fertility imbalances). It's not a demanding grass; indeed, it resents fertilization that strongly forces growth. Where adapted, centipede has few equals for easy-to-get-along-with lawns, which is doubtless why another of its popular names is "lazy-man's-grass."

Eremochloa ophiuroides is a Far Eastern species introduced from China by the USDA in 1916 (some references) or 1919 (other citations, including the Agricultural Yearbook, *Grass*). There are no recognized varieties, although a hardy selection is reported ready from Oklahoma. Strains are distinguished by stem color, with some authorities suggesting superiority of a red-stemmed introduction (PI 72260), and others (University of Florida) seeming to prefer green-stemmed types.

Eremochloa is a small genus

of the bluestem (*Andropogon*) tribe. It consists of a handful of species native to southeastern Asia and the East Indies. The majority are passably fine-leaved, and further search might uncover breeding stock worthy of introduction.

Adaptation and Appearance

Centipedegrass is at its best on the Coastal Plain from North Carolina south through southern Georgia, and northern Florida west into Mississippi. It has had limited success west of the Mississippi River (possibly because of increasing soil alkalinity in more arid regions), and is scarcely consequential in Arizona and southern California. A more usable western centipede might come from the pending Oklahoma release. Although centipede survives north into Tennessee, it is discolored by frost rather readily, and is seldom so useful as bermuda and zoysia in the upper South.

Much of the region where centipede is heavily used has sandy soil. Yet centipede grows on clays, too, although it prefers well-drained to waterlogged locations. A major weakness is yellowing (chlorosis) for lack of available iron, a condition often triggered by soil alkalinity. So centipede has gained a reputation for being adapted only to acid soils. Yet it flourishes without special precautions on some alkaline soils of south Florida; there's probably a lot more to it than mere tying-up of soluble iron at a pH above 7. Probably a complicated interaction of nutrients and trace elements determines centipede's peculiar sensitivity to iron (with growth stimulated by N in spring, or K in summer, it seems unable to pick up sufficient iron, especially if P is high!).

There is no question that centipede is one of the better southern grasses where low fertility prevails. In the give-and-take of ecological progression, centipede then has the advantage. With no help other than mowing, it can aggressively spread through and eventually dominate a turf (this is one reason for keeping centipede away from pastures, where

it is a poor yielder of non-nutritious forage). Though centipede responds well initially to high fertility, it often turns up its heels the next year. And it is probably not quite so good a shade grass as are *St. Augustine*, *bahia*, and *zoysia*, though far better than bermuda. In southern Georgia centipede delights in the open shade of pines.

As its poor reputation for forage might suggest, centipede is low growing, seldom over a few inches high even when unmowed. This can be quite an advantage for lawns only sporadically tended. Mowing need not be frequent (each 10-20 days), although with any lawn weekly mowing keeps things tidier. Mowing is not difficult, even with light equipment, which is quite a contrast with *zoysia*. Moreover, centipede is hardly injured by scalping, often a problem with rampantly growing species that produce abundant top growth. Centipede is usually mowed about 1½ inches tall. Seedheads are relatively low and inconspicuous, certainly not the problem we have noted with certain bermudas and *bahia*.

Centipede spreads by thickish, trailing stems (stolons) that stay flat against the ground. Fortunately, they have fairly short internodes and thus a dense presentation of leaves. The stolons, of course, root at the joints. The leaf blades are of medium width, finer than *St. Augustine*, but coarser than the better bermudas and *zoysias* or the famed bluegrasses or fine fescues. Speaking of bluegrasses and fescues, one is reminded that centipede grows so dense that winterseeding with these excellent wintergrasses is more difficult in centipede than in bermuda.

Performance and Care

Outstanding is centipede's ability to develop slowly into an aggressive, relatively weedfree turf, with very little attention. Yet being strictly stoloniferous, it is not hard to control at borders. In contrast with bermuda, edging once per year usu-

ally suffices. Centipede does not recover so quickly as does bermuda, nor does it wear so well as tough zoysia. Thus it is seldom recommended for heavily trafficked swards such as play fields.

The quality of centipede turf is not up to that of finer textured bermudas and zoysias. It is used chiefly where this is less important than ease of maintenance. We have remarked on centipede's adaptability to acid soils (so that liming is seldom called for), and its low fertility requirements (a single feeding in the spring often suffices). However, authorities usually recommend at least two yearly feedings, at about 1 lb. actual nitrogen each time, ordinarily employing a complete fertilizer.

Iron chlorosis can be corrected in some soils by adjusting the pH to mild acidity, as with sulphur-containing products (for alkaline soils), or perhaps by liming very acid ones. Up to 10 lbs./M of iron sulphate should give relief, and iron sulphate sprays cause immediate greening. An iron chelate such as DTPA at 1 lb./M may have a more prolonged influence than iron sulphate.

Except for the sucking, scale-like "ground pearl," centipede is relatively free of insect pests. Chinch bugs, the scourge of St. Augustine, hardly bother it. Ground pearls dwarf the roots, debilitating the grass. No practical control has yet been found, and where ground pearls are very serious, probably the easiest course is to switch to another grass. Nematodes may cause similar debilitation, though the turf should then respond to nematocides. Nor are diseases very serious on centipede. Brown patch can be checked with general fungicides, such as Thiram and mercurials.

Weed control is much the same as with St. Augustine, except that centipede is tolerant of 2,4-D. In the early stages of lawn formation, centipede may profit from preemergence crabgrass preventers (for sprigged or plugged lawns, not seeded ones), or simazine and atrazine. Don't use arsenates. Fortunately, cen-

tipede eventually forms so thick a sod that it fights many of its own weed battles. Perennial centipede will ordinarily crowd annual crabgrass into submission the second year.

Centipede endures drought reasonably well. Though turning completely brown, it recovers quickly with rain. But to be consistently attractive, lawns require occasional irrigation in dry weather. This is especially important on the prevailing sandy soils of centipede country, which hold so small a moisture reserve. Centipede is not tolerant of salt sprays, so is not for seaside plantings.

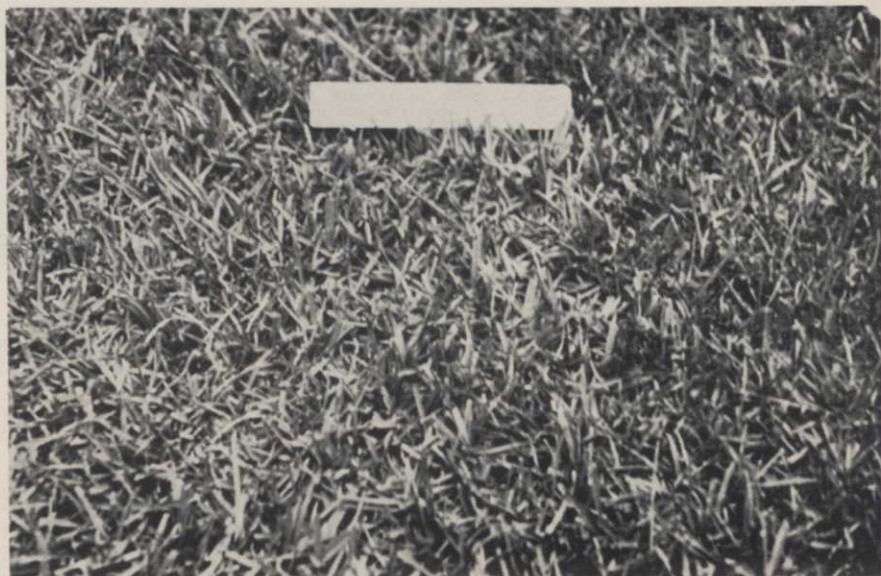
Propagation

Centipede has long been propagated vegetatively by sprigs or plugs. A cultivated and fertilized seedbed may be planted in rows about a foot apart, with individual starts 6"-12" apart in a row, sprigs buried 1"-2" deep at one end but most green leafage left above ground. Or live starts can be introduced into an old lawn, to infiltrate and eventually take over. Of course, the prepared seedbed offers a much better opportunity for quick and thorough establishment.

For some years centipede seed has been available in limited supply. Maintaining centipede

stands just for seed, plus difficulty in harvesting the low, infrequent seedheads, makes seed understandably costly (quotes run up to \$15 per pound). But there are nearly 1/2 million seeds to the pound. One might prefer sowing a pound or so/M, but cost dictates lighter sowing, only a couple of ounces (extended with inert) per M. Even very light sowings eventually dominate, although sprouting may be slow and seedling expansion deliberate. Seeding is best in spring, raked lightly into a prepared seedbed, watered consistently for several weeks. There are excellent centipede turfs in parts of Florida where the owners don't remember ever having started the grass, so seed must be effective in spreading the grass.

All in all, centipede is a distinctive grass, of great usefulness for lightly maintained turfs of the southern Coastal Plain. By and large it is of "intermediate" nature, being neither fine textured nor coarse, not without troubles but neither prone to disaster. It is also middle-of-the-road in cold hardiness, drought resistance, shade tolerance, and in most other respects. With time centipede makes a tight, weed-repressing sod that is easily tended.



Closeup of a healthy stand of centipedegrass shows typical characteristics that make it a "middle-of-the-road" species, such as its texture which is neither fine nor coarse.

√ ☒ New Ways to Apply

INCREASING water consumption, engendered by the population and industrial growth of the United States, has presented water managers with many problems in obtaining a product of the highest purity.

Not the least of these is the constant battle against microscopic organisms manifested in the various forms of algae, whose presence can give water a distinctively unpleasant fishy taste and odor. While taste and odor

are not of prime importance to industry, pumps, boiler tubes, filters, etc., can be clogged by algae, leading to expensive shut-down of equipment. In the manufacture of inks, dyes, paper, and in photographic processing, the presence of algae can cause an end product not up to acceptable industry standards. And many contract applicators wage constant war on algae in private lakes, ponds, marinas, etc.

The use of copper sulfate as an

algicide is standard practice. However the method of applying the chemical is varied and reflects local conditions and requirements.

While the dragging of a burlap sack filled with copper sulfate crystals behind a rowboat is still being used, labor costs have dictated more efficient procedures.

The Phelps Dodge Refining Corporation Information Service, as part of its program of providing data pertinent to water

A 100-lb. bag of large copper sulfate crystals is fed into bronze-screen hopper by this workman for the Seattle Water Department. Two-point pivot mounting allows hopper to ride up should it strike underwater objects or shallows.



Aquatic Herbicides

treatment, has been in contact with water management personnel throughout the U.S. regarding the types of application equipment employed. Some of these methods will be of interest to those charged with algae control.

WTT readers may obtain detailed drawings and specifications of the equipment described in this survey through the Information Service, 300 Park Avenue, New York 22, N. Y.

Blower System

One method, for example, is used on occasions where it is desirable to *blow* a chemical dust rather than use a slurry or solution. The Helix Irrigation District of La Mesa, California, uses such a system.

The principal advantage of the blower-type machine is the ability to treat large surface areas rapidly with a light dosing of material. Another advantage is the breaking down of crystals in the blower to a fine dust.

The blower operates from 3,000 to 3,500 rpm, which has the tendency to grind the commercial-grade CuSO_4 snow into smaller particles. These small particles are blown into the air, and wind currents assist in spreading them over the surface of the water.

Certain disadvantages are found in the blower-type machines. For example, the larger machines are heavy enough to reduce the permissive load of chemical in the boat; and two or more men are required to transport the units in and out of the watercraft. The machines also need continual adjustment by a trained operator, such as a contract applicator, to maintain a constant feed and to obtain an even distribution of copper. An excessive rate of feed may clog the discharge spout. Use of these blower-type machines is dependent upon the wind for distribution of chemical, and with shifting winds the boat crew as well as the reservoir may be dusted with the material. There is always the loss of varying amounts

of copper sulfate dust that is carried away by the wind and then settles upon the above-water shoreline of the reservoir.

The calm, nearly perfect day is far from ideal for this type of water treatment. It means a much lighter feed of copper sulfate and much closer treatment lanes which require a considerably longer time to cover the given area. Optimum weather conditions consist of light winds of 10 to 15 mph blowing steadily

from one direction. This permits a higher rate of copper sulfate feed, and a marked increase in the width of the treatment lanes, thus decreasing the total time of treatment considerably. An area of 1,804 acres can be treated under favorable conditions in $4\frac{1}{2}$ to 5 hours with 5 tons of the algicide. On a calm day, treatment would require from 10 to 12 hours for completion. Reservoir treatments should be com-

(Continued on page 24)



This blower dispenses copper sulfate for the Helix Irrigation District of La Mesa, California.

Blowers for dispersing aquatic herbicides and algicides can also be mounted on trucks, as is this machine used for treating the Seattle Water Department Reservoirs.



North Central Weed Control Conference

(from page 10)

cide for the commercial applicator in industrial weed control," Hallett said.

Dacogen, a fourth product, but still in the premarket experimental stage, is a phenoxy herbicide formulation with a physical spray drift inhibitor. It bowed to the NCWCC with the help of technical man, R. L. Schauer, Diamond Alkali Co., Cleveland, Ohio.

"This material is added in powder form to water in a spray tank. The powder will contain concentrations of 2,4-D, or 2,4,5-T, or both. Dacogen acts as a liquid while being agitated and sprayed. But after contact with a plant surface for a few moments, it reverts to a gel state," Schauer explained. This phenomenon may be likened to the solidification of a gelatin dessert.

"Once applied, Dacogen is sticky," the Diamond rep went on; "it adheres to plants, keeping the herbicide in contact with plant tissue longer. This happens because the gel hardens and encapsulates the herbicidal material beneath the shell. Upon complete drying, the Dacogen formulation produces a film, still attached to the plant where it was sprayed. The material also inhibits volatility," Schauer said.

Aquatic Talks Well Attended

As the section symposiums got underway on the second day, WTT reporters found topics of interest being aired in the well-attended Aquatic Weed Control session.

"Aquathol and Hydrothol are two aquatic herbicides from Pennsalt Chemical Co., which have found value in weed control programs where fish safety is a factor," Harold Lindaberry, Northern Technical Supervisor for Pennsalt's agricultural division in Aurora, Ill., said.

Both compounds have endo-thall as an active ingredient, but formulations produce differences in herbicidal activity. Lindaberry explained that Aquathol is an effective herbicide for many submersed weed species at 1 part per million, a rate far below that where fish will be harmed. He related that Pennsalt experienced no mortalities when Aquathol was fed to laboratory dogs at 800 ppm daily.

"Hydrothol is formulated with the amine salt derived from coconut oil," Lindaberry went on. This changes the activity so that the compound is effective at concentrations of 1/10 to 4/10 ppm. Hydrothol is correspondingly more toxic to fish, however.

No Aquatic Cure-alls

An underlying theme of the conference emerged during the open discussion of the aquatic session. It is that there are no cure-all chemicals. Chemicals are tools designed to do specific jobs and should be planned or programmed for this purpose.

Session moderator, John Gallagher, Amchem Products Co.,



Industry and education find common ground at breaks between scheduled sessions. Pennsalt's Harold Lindaberry (left) hears Ohio State horticulture professor Dr. E. K. Alban's views on ornamental crop weed control.

Ambler, Pa., drove a point home when delegates debated the advantage of weed-free water. Completely weedless water may not be the desired end. When conservation interests are involved, as they are with increasing frequency, it may be desirable to induce new plants to establish in the vacancies. This is particularly true on wildfowl refuges. Instead of letting nature take her course, a farsighted operator will disperse millet or smartweed seed to produce an improved habitat with waterfowl food plants designed for best possible use of the water body. The aquatic weed controller must be an ecologist, able to make best possible use of available water, not simply one who chemically removes weeds from water.

Crabgrass Trials Failed

1964 was a strange year for crabgrass. It did not germinate on schedule, and in many places not at all, to any significant degree. This put researchers test-

ing preemergence herbicides in the awkward position of not having any test plants.

Dr. Robert W. Miller, professor of agronomy, Ohio State University, Columbus, revealed that crabgrass failed to establish because of dry weather. A second germination period did occur, but if turf was not irrigated, this weed crop failed, too.

"These conditions force us to take another look at preemergence herbicides," Dr. Miller asserted. "During years when unseasonably dry weather occurs, it will be necessary to apply preemergence materials which last throughout the season."

As an alternative, Dr. Miller offered split applications of herbicides that are not active season-long.

"We do have a good selection of preemergence crabgrass controllers, but there is room for improvements," Dr. Miller feels.

Improvements he would like to see include: good long-season control; herbicides specific for annual grasses; materials which will permit perennial lawngrass seeding the same spring as preemergence treatments; material which does not damage turfgrass; more latitude on date of application; and preemergence material for crabgrass and annual bluegrass in bentgrass turf.

How Santa Fe Kills Weeds

"There are numerous reasons why weeds along railroad lines must be controlled," Dave Yazell, Vegetation Control Engineer for the Santa Fe System, Albuquerque, N. M., began in his talk at the session on industrial weed control, during which he explained the Santa Fe's maintenance methods.

Older methods of burning and on-track and off-track mowing are being replaced by chemical treatments. Yazell listed four kinds of treatments his railroad uses. Bare-ground control requires sterilant chemicals and is initially high in cost. Annual maintenance costs are of course reduced. Santa Fe uses what it calls abatement control; this offers a high degree of general weed control, but no bare-ground results. Chemical mowing with materials such as pentachlorophenol or sodium chlorate retards plant growth.

Under selective chemical control, Santa Fe eliminates noxious

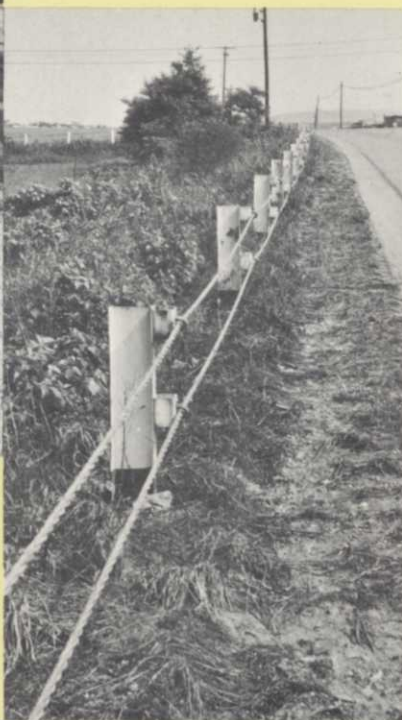
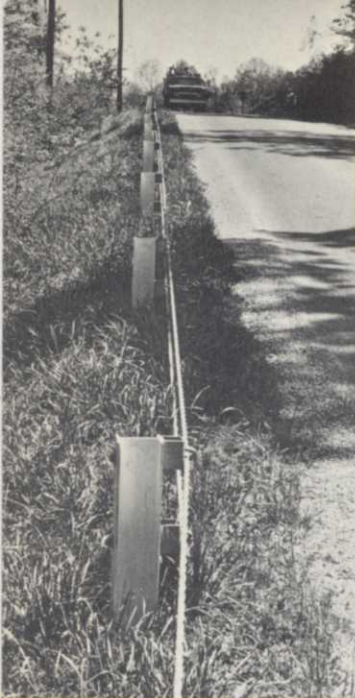
(Continued on page 21)



Industrial Weed-Brush Control

made to order to keep grounds more attractive and reduce costs by saving on hand labor.

A good maintenance-management program around industrial plants is now considered just as important as attractive furniture and clean surroundings inside. Good "house-keeping" can be an important factor in employee and community public relations. Buildings, no matter how well-planned, can look unattractive if surrounding areas are not kept clean and weed-free. This is why more and more *(continued on back page)*



▲ Highway guard rail before spraying with Amizine herbicide.

One week after application, weeds and grasses were white or brown. In three weeks vegetation was dead. Amizine provides full season or longer control.



▲ Amchem's skill and research provide continuous improvements in weed and brush killers that provide better control for your weed control dollar.

AMCHEM HAS THE RIGHT WEED-BRUSH KILLER FOR EVERY PURPOSE:

There are more than 60 high quality Amchem weed and brush killers to answer the most difficult vegetation control problems. Every one of these herbicides or compounds has been carefully formulated and thoroughly tested at Amchem's research farm as well as on research and experiment stations throughout the nation. Every product is tailored to give you the most complete, economical control feasible under your own conditions. One or more of these herbicides or combination products is just right for **your** vegetation control problems.

Amchem research has pioneered more developments in weed and brush control than any other company. Amchem originated 2,4-D, 2,4,5-T and Aminotriazole weed killers. Then they introduced a whole new concept of selective weed and brush control to assure continuous improvements in material as well as special application methods. Amchem combines their technical skill, research, production know-how and field services to give you herbicides with a "performance difference." The Amchem difference can make a big difference in your labor efficiency and help cut your costs.

SPECIALIZED WEED KILLERS

AMIZOL®

Provides outstanding top kill and moves throughout weeds' system to kill roots. Controls most annual broad-leaf weeds and grasses. Effective on poison ivy, poison oak and many other woody plants.

AMIZINE™

One application gives dependable kill of existing weeds and grasses and prevents regrowth from germinating weed seeds for a full season or longer.

FENATROL®

Very effective in lower rainfall areas. Kills growing weeds and prevents new weed growth. Controls puncture vine, Russian thistle and kochia.

AMITROL-T

Knocks out hard to kill deep-rooted perennial weeds like Canada thistle, quackgrass, poison ivy and many others.

FENAC®

A single treatment controls problem weeds like kochia, Russian thistle, puncture vine, knapweed, bindweed and seedling weeds and grasses.

SPECIALIZED BRUSH KILLERS

WEEDONE®

Formulations: WEEDONE BRUSH KILLER 64; WEEDONE INDUSTRIAL BRUSH KILLER and WEEDONE 2,4,5-T. Superior formulations for outstanding control of hard-to-kill woody plant species.

DINOXOL® AND TRINOXOL®

Formulations: DINOXOL 64, DINOXOL, TRINOXOL. Special concentrated herbicides for control of woody plants.

WEEDAR® AMINE BRUSH KILLER AND WEEDAR 2,4,5-T

Spreader-sticker added for more effective wetting. Use in place of ester brush killers when high temperatures are common, or volatility is a factor.

ENVERT

Formulations: ENVERT DT; ENVERT T. Thick, viscuous water-in-oil formulas for aerial application by helicopter for special brush problems (root suckering species), high brush or in areas relatively inaccessible.

EMULSAMINE® BRUSH KILLER AND EMULSAMINE 2,4,5-T

Special formulas developed to use where maximum safety from volatility is required in areas of high temperature.

HOW YOU CAN CUT COSTS ON ALL THESE INDUSTRIAL USES WITH AN AMCHEM HERBICIDE PROGRAM



Roadside Maintenance

More efficient and economical use of men and equipment is an important reason why highway engineers and contract applicators are using an Amchem highway vegetation control program. AMIZINE and FENATROL herbicides can reduce maintenance costs and increase beauty because just one application kills growing vegetation and prevents regrowth from germinating weed seeds for a full season or longer. The proper use of these special Amchem products can just about eliminate mowing and hand clipping along roadsides, under guard rails, around sign posts, trees, fences and bridge abutments.

Utility Rights-of-Way

How to keep labor and expenses low when controlling mixed brush in rough or inaccessible terrain on rights-of-way where brush is too tall to spray with ground equipment has been answered with Amchem's aerial application programs. Amchem's thick ENVERTS (water-in-oil emulsion formulas) are formulated for precision application and effective control with minimum drift when applied through Amchem's patented SPRA-DISK applicator mounted on a helicopter. Many contractors are experienced in the use of these formulas and application methods. Amchem has a full line of specialty brush killers including those for ground application to answer the most difficult brush and weed control problems.

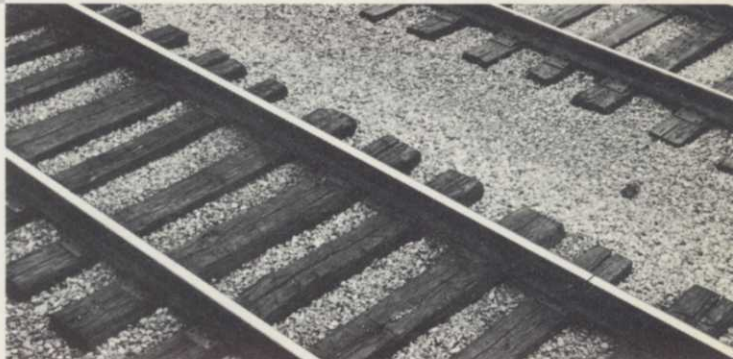


Industrial Grounds Maintenance

Grounds maintenance supervisors and contractors want maximum beauty at minimum cost. Amchem's specialty herbicides keep costs down by saving on hand and machine labor. For example, hand clipping and maintenance can almost be eliminated around buildings, trees, ornamental plantings, storage areas, and on stone walks, parking lots and fencelines with just one application of AMIZINE herbicide. This product provides fast, dependable kill of growing vegetation and prevents new weeds from sprouting for a full season or longer. It's safe when used as directed, nonflammable, odorless, does not stain concrete or metal—won't corrode sprayers or tanks.

Railroad Vegetation Control

Cost-conscious railroads have been successful in lowering the cost per mile, per day of effective weed and brush control. Amchem's special herbicide programs help cut maintenance costs more effectively. Each different area of the country requires a specific program tailored to solve its own vegetation problem most economically. These programs for track and yards are developed by areas for each railroad. Program recommendations are based on results from large areas treated with the best herbicides or combinations applied by Amchem's specially designed spray car. There is a full line of Amchem foliage (stem) sprays for mixed brush and trees on rights-of-way, and other specialty chemicals for brush control.



WHY AMCHEM HERBICIDES CAN SAVE YOU MONEY

Amchem specializes in the weed and brush control field. Amchem herbicides are formulated from the finest raws and consist of chemicals refined to a far higher degree of purity than ordinarily found. This invisible margin of product purity results in the maximum obtainable effectiveness for each formulation—a margin of performance that often pays off visibly.

Many Amchem herbicides are effective on a wider

range of weeds and brush—they control the hard-to-kill species. Amchem has designed selective chemicals and combinations for maximum control in different areas of the country. They have introduced and encouraged new labor and cost saving application methods. When you add up all these benefits, you save money because you get the most efficient results.

(continued from front page)

maintenance supervisors or maintenance contractors are using an Amchem vegetation control program to provide maximum beauty at minimum cost.

Although maintenance costs continue to go up, many companies are able to "hold the line" or even reduce costs by saving on hand and machine labor. This is possible, for example, because special Amchem combination herbicides like AMIZINE or FENATROL make possible practical short cuts that can now save important time and dollars.

It's possible to eliminate hand clipping around buildings, trees, ornamental plantings, storage areas, and on stone walks, parking lots and fence-lines with just one application of AMIZINE. The almost endless—and costly—job of hand trimming grasses and tough weeds is not necessary. AMIZINE or FENATROL provide positive top kill of growing vegetation and prevent regrowth of germinating weed and grass seeds in the soil for a full season or longer. They kill a larger variety of weeds and grasses including deep-rooted perennials.

AMIZINE and FENATROL are easy to apply in any standard sprayer—won't corrode equipment. They are non-flammable, odorless and won't stain steel, concrete, etc. You can save money on profit-robbing maintenance costs—lower the cost per day of effective weed control on a full season basis—with these amazing products.

FENATROL is recommended for areas where there are no desirable shrubs or trees nearby. It contains a powerful combination of three weed killers that affect both growing and germinating weeds. It is

extremely effective where puncture vine, Russian thistle and kochia are problems, and in low rainfall areas. AMIZINE is ideal in normal rainfall areas. It contains a highly effective balanced combination of fast-acting post-emergence weed killer and a long-lasting pre-emergence weed preventer.

There are a full line of Amchem selective weed killers for turf areas and brush killers for control of mixed brush and trees to save labor and cut costs.

AMIZINE Mixing Directions (Dry Powder)

AMIZINE	WATER	AREA
1 cup	2 gallons	500 sq. ft. (10' x 50')
1 pound	5 gallons	2,000 sq. ft. (40' x 50')
5 pounds	25 gallons	10,000 sq. ft. (100' x 100')
20 pounds	100 gallons	1 acre

FENATROL Mixing Directions (Liquid Concentrate)

Apply 9 gallons of FENATROL liquid per acre in at least 100 gallons of water per acre. For smaller areas, use 2 gallons of FENATROL in at least 20 gallons of water per 10,000 square feet. In low rainfall areas, apply 4½ gallons of FENATROL in 100 gallons of water.

Write for FREE brochure with full instructions on Amchem's industrial weed and brush killers.

APPLICATION METHODS WITH AMCHEM BRUSH CONTROL HERBICIDES

1. FOLIAGE APPLICATION

This method requires complete wetting of all foliage and stems while vegetation is actively growing. The carrier is water or an oil-water carrier can be used. Herbicides used: Weedone Brush Killer 64, Weedone Industrial Brush Killer, Weedone 2,4,5-T, Weedar Amine Brush Killer, Weedar 2,4,5-T, Emulsamine Brush Killer, Emulsamine 2,4,5-T.

2. MODIFIED BASAL APPLICATION

This technique is for oil-water emulsion spray. Drench base of plants. Then wet remaining stems and leaves to run-off, spraying the lower 4/5 of the plant from bottom up. Treat when brush is in full foliage. Herbicide used: Weedone Brush Killer 977.

3. DORMANT CANE BROADCAST SPRAYING

Use this method in the fall after plants are dormant. Spray the base of the stems sufficiently for good run-down to root collar zone and broadcast spray to wet all aerial portions. Spray all ground to control small root suckers. Oil is the carrier. Herbicides used: Dinoxol 64, Dinoxol, Trinoxol.

4. BASAL BARK APPLICATION

This method employs oil as the carrier. The spray solution is directed at the base of all stems until spray puddles on all sides and collects around root collar at ground line. Apply any time of year. Herbicides used: Dinoxol 64, Dinoxol, Trinoxol.

5. STUMP APPLICATION

Spray solution at base of all stems until spray puddles on all sides and collects around the root collar at ground line. Carrier is oil. Spray at any time of the year. Herbicides used: Dinoxol 64, Dinoxol, Trinoxol.

6. AERIAL APPLICATION

Amchem's Spra-Disk® applicator mounted on a helicopter using Envert formulas gives outstanding control on rights-of-way where brush is too tall to spray with ground equipment or in rough, inaccessible terrain. Precision, low drift safety. Herbicides used: Envert DT, Envert T.

AMCHEM PRODUCTS, INC.

amchem

AMBLER, PENNSYLVANIA

First name in herbicide research

North Central Weed Control Conference

(from page 20)

weed species along its track where state laws demand. Brush control is selective and Santa Fe uses several methods in its program, Yazell revealed. Summer foliage treatments with combinations of 2,4-D and 2,4,5-T are effective in areas where there is no drift hazard. When track adjoins farmland, Santa Fe uses ammonium sulfamate. Recently dormant cane broadcast has gained favor with Santa Fe controllers. Yazell stated that the dormant cane method is comparable in cost to ammonium sulfamate summer treatments.

For cleanup treatments of hard-to-kill plants, either a 3% 2,4-D basal spray, or hand treatment with pelleted materials like fenuron, are used.

Yazell advised controllers with similar programs to be aware that continued use of a single chemical for control along rights-of-way will permit a buildup of species not susceptible to the chemical in use.

Highways Have More Acreage

"Expressways have four times more roadside than conventional roadways," Jack Burton, District Forester, Michigan State Highway Department, Alpena, revealed. "Regular roads have seven adjacent acres to a mile, but new expressways have 28 acres per mile." Burton told the NCWCC how his department maintains these extra acres in his talk, "Methods and Problems of Weed Control Along Highways."

Burton said the Michigan Highway Department relies on five types of weed control: selective sprays, growth retardation, brush control, ditch weed control, and soil sterilization along guardrails, signs, etc.

"Last year 3,000 miles of Michigan highway were spring sprayed with 2,4-D selective sprays. In April, May, and June, we use 1 to 2 lbs. of 2,4-D esters per acre. For the fall spray program, we combine 2 lbs. of 2,4-D with 2 lbs. of 2,4,5-T," Burton detailed.

This kind of roadside spraying, which Burton said has been used since 1948, is performed both by state spray rigs and by contract with private sprayers.



Asplundh: "Helicopter use will be increasingly economical as labor costs continue to rise."

"This practice does not eliminate mowing, but we have reduced it, and it pays off," the highway forester remarked. He said that the Department is ahead if only one round of mowing is eliminated, since mowing is three times as costly as spraying.

"For brush control, we use the cutting method, then spray the stubble," Burton revealed. "We respray the foliage which resprouts."

Delegates heard that anything which slows water movement in drainage ditches is bad for the highway. Michigan uses dalapon with success on cattails along roadsides. The highway official reminded controllers to spray vegetation which appears in cracks in roadside concrete gutters, and in sealed shoulders, so cracks will not be opened further by the force of growth.

"This year maleic hydrazide

grass growth regulator worked for us," Burton announced. Areas which had been mowed seven to eight times per summer in previous seasons, needed to be mowed only twice this past year.

Contractors Offer Views

Contract applicators were represented on the NCWCC program also. Herbert Hackman, Western Soil Management, Philadelphia, Pa., told the industrial session where he felt his company fits into the picture.

"We're a service organization, and we guarantee the work we say we will do," he began. "We like to think of ourselves as doctors; we will look at your problem, diagnose the trouble, and prescribe a control program."

"Since we guarantee our work, we feel it necessary that we are permitted to choose the chemical to use to get the best and safest results, and the time of application so control will be optimum," Hackman explained.

Hackman also revealed that a service of his company provides a weed specialist under contract to any agency or company which does not have one. As a consultant, a specialist will advise the proper treatment and oversee work performed if a company wants to do the work itself.

Helicopter Future Bright

"Helicopter applications for brush control will increase as more nearly perfect aerial systems come along, and will become more economical as labor costs increase," Edward Asplundh, head of the Aviation Division of Asplundh Tree Expert Co., Jenkintown, Pa., predicted in the session devoted to woody plant control.

Asplundh reviewed the history of early applications and told of recent chemical developments to

Weeds for lunch?

No, but the WTT camera caught Dr. Robert Hiltibran (left) of the Illinois Natural History Survey, Urbana, and James Whitley, Missouri Conservation Commission, Columbia, talking about aquatic nuisances after the dishes were cleared.





New Homelite XL-Automatic

prunes, limbs, trims, and cuts

30% Faster!

It weighs only 14 pounds,* but cuts 30% faster on all woods . . . 10" limbs in 5 seconds! It has 35% greater fuel capacity than the famous Homelite XL-12 Chain Saw. Automatic chain oiling speeds cutting, reduces wear on bar and chain. Simple to handle in the tree — or on the ground, even for close cutting. Enough power to cut 4-foot diameter trees . . . even cut 15" hardwood in 20 seconds. Maintenance is negligible.

See it now. Demonstration is FREE — at your Homelite dealer, or in your own orchard or grove. *Homelite's XL's are the fastest selling chain saws in the world.*

*less bar and chain

HOMELITE A textron
DIVISION



3902 RIVERDALE AVENUE, PORT CHESTER, NEW YORK

aid aerial application. "Helicopters have been considered for brush control since the 1940's, but drift of unthickened material to nontarget areas was the biggest hurdle."

Chemistry jumped the hurdle, according to Asplundh, with the development of invert emulsions, a heavy emulsion of water in oil instead of oil emulsified in water. He explained that early inverts would break or separate too soon, but today's products when properly mixed will stand for days without separation.

"In the early days, mixing techniques were such that we could only apply 4 to 6 lbs. of 2,4-D acid per acre from the air," Asplundh continued. "But today 8, 10, and 12 lbs. per acre are not uncommon. We have even applied as much as 20 lbs. per acre of 2,4-D acid on tall resistant brush."

Some chemical systems which are or soon will be available were listed by the Asplundh official. "The Amchem system uses a premixed invert emulsion which is applied through a whirling disc. The speed the disc turns at determines the swath width; this can be controlled by the helicopter pilot.

"The Hercules system, called Rhap-Trol, keeps the water and chemical apart until it reaches a special bi-fluid nozzle where it is mixed, thickened, and released.

"Dow Chemical's system involves a boom adapted to thickened material," Asplundh disclosed experiments with Dow's Tordon applied by air. He said Dow is developing a thickener, called Norbac, which when added to a water spray mix produces a tapioca-like consistency. It can then be dispensed through a boom arrangement.

"Our first helicopter purchase was a Sikorski, because it had the power we needed to carry the chemical payload. Later when Bell Helicopter increased the power on its design, we purchased some of these, because they can be trailered to the treatment site. Our present fleet includes both."

Helicopter Crew Details

"Number one man on the spray crew is the supervisor," Asplundh said; "he is experienced with chemical use, knows flight plans, and gets along well with the public and government officials.

"Our helicopter pilots are truly specialists," Asplundh went on. "We train them ourselves for a job which is much more difficult than just flying, at which they must be expert also." Asplundh pilots attend a special school before going on the job, then they must attend refresher courses periodically.

Since helicopters must be in perfect working condition at all times, and on-the-job repair time must be minimal, a trained mechanic is the important number three man.

"We supplement our ground crew force with vacationing college men. They drive the mixing trucks and recharge empty spray tanks at predetermined heliports," Asplundh explained.

A typical spray schedule is tedious because bulk of work is done in morning and evening before wind comes up. Wind speeds over 6 mph hamper operations. Weather is probably the biggest cause of lost job time, the brush control expert disclosed.

"In the brush control business, when you have made expensive

investments, you either must do the same job as someone else would for less money, or a better job for the same money. I can see where much utility line spraying for brush control will demand the use of helicopters in order to be economical," Asplundh concluded.

New officers for the North Central Weed Control Conference were elected at this annual meeting. Replacing Dr. D. D. Hemphill, Horticulture Department, University of Missouri, Columbia, as president for the 1965 term is John D. Furrer, Agronomy Department, University of Nebraska, Lincoln.

R. L. Warden, Plant Science Research and Development, Dow Chemical Co., Midland, Mich., is the newly elected vice president.

G. Clare Buskirk was reelected as secretary of the organization. Buskirk is from Lincoln, Neb., also.

Proceedings of this 20th meeting will be compiled, secretary Buskirk told WTT. Availability of a complete transcription of the conference will be announced in WTT at a later date.



ALWAYS MEAN

SAFE SPRAYS

Arborists and Custom Spraymen have depended upon PRATT'S for quality spray formulations for over half a century.

Start your schedule with SCALECIDE—the "dean" of the Oil Sprays. So safe that it can also be used as a foliar spray.

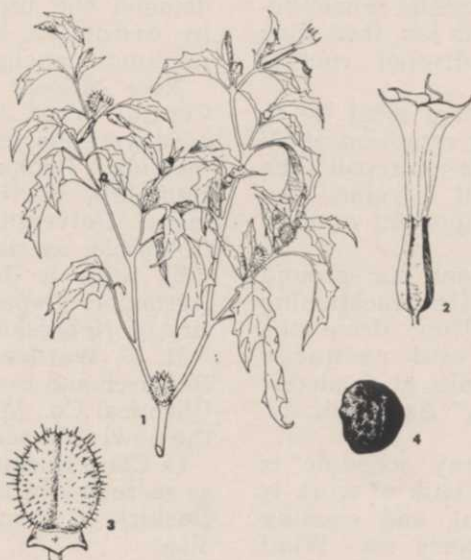
Pratt's formulates a complete line of emulsifiable concentrates for hydraulic and mist blowers and oil base concentrates for thermal fog equipment.

Send for our free circular, "Pratt's Spray Bulletin for Shade Tree Spraying."

Distributorships available for the complete line of PRATT'S Sprays—write for information.

B. G. PRATT COMPANY
215 21st Avenue, Paterson, N. J.

JIMSON WEED (*Datura stramonium*)



Jimson weed is an annual, reproducing by seeds, which is variously known as Jamestown weed, stinkwort, thornapple, and trumpetplant. It is widespread across the United States and southern Canada, but is more troublesome in southern North America. It was introduced from South America as an ornamental.

Jimson weed is found on silty or gravelly soils in low areas, fields, and waste places such as dumping grounds.

Stems (1) grow 2 to 4 feet tall. They are smooth, stout, and widely branching. Leaves are oval, with shallow, irregularly toothed margins. Leaves occur alternately on thick stems. They have a distinct foul odor.

Flowers (2) are large, either white or purplish, funnel (trumpet)-shaped and 2 to 5 inches long. They are borne singly in the axils (junctures) of leaves.

After flowering, the unique seed pod (3) develops. It is ovoid with a crease extending from the base over the end and down the other side. The pod is covered with short, sharp spines. It measures about 1 inch in diameter. Many dark-brown seeds (4) contained in four sections of the pods, are circular, flat, and wrinkled. Seeds are permitted to fall when autumn dryness causes the pod to curl back along the crease and release the seeds.

Roots are thick and fleshy, very much branched, and shallow.

There are two related southwestern species: the desert thornapple, *Datura discolor*, and the sacred datura, *D. meteloides*, which are readily distinguished as *Datura* spp. by the funnel-shaped flowers or the spiny seed pod, but these species differ in size and coloration.

All *Datura* spp. are members of the Nightshade family, Solanaceae, renowned for members which possess poisonous properties.

All parts of the jimson weed plant are poisonous when eaten by man or animals. Some sensitive individuals contract dermatitis (skin rash) when they touch jimson weed.

Jimson weed is easily controlled with 2,4-D or 2,4,5-T. Many seeds of this weed which lie dormant in the soil necessitate continuous controls with these herbicides year after year for several seasons before complete control is achieved. Of course, jimson weed is vulnerable to soil sterilants.

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)

New Ways to Apply Aquatic Herbicides

(from page 19)

pleted in one continuous operation. A layoff of even a few hours may result in the shifting of water to such an extent that some areas may be undertreated, with a resulting decrease in effectiveness of treatment — or, may be overtreated with resulting hazards to fish life.

The blower-type machines are of various sizes and weights, but basically they are all of the same construction pattern: (1) a hopper with sloping sides holding 130 to 170 lbs. of material; (2) an agitator just above the bottom of the hopper having a speed of from 15 to 30 rpm; (3) an adjustable orifice to feed from 5 to 60 lbs. per minute; (4) gas engines, 2½ to 6 hp at 3,500 rpm; (5) 14" to 16" blowers directly connected or V-belt driven, with chemical fed directly into the suction port and 4" to 7" outlet spout for dispersion; (6) a light frame to support counter shafts and hopper speed reducer. The total weight of the unit will vary from 250 lbs. to 450 lbs., depending upon the size and type of material used.

The cost will naturally vary depending on the size, equipment, and personnel available for fabrication. The engineering department of Helix estimates approximately 50 hours of time and a total cost in the neighborhood of \$1,000.00.

Screenhopper—Power Boat

To quickly and efficiently treat not only the 725 acres but also the seven-mile shoreline of their primary storage reservoir, the Seattle Water Department has designed and built two specialized pieces of distributing equipment. For the treatment of the reservoir itself a large, bronze, mesh-screened hopper was constructed.

The screen has a ¼" mesh and is supported on a framework of extruded steel angle stock. Two-point pivot mounting permits flexibility and prevents damage

in the event it is grounded in shallows or shoreline areas.

The mounting is designed to place the hopper directly in the agitation created by the boat propeller to provide rapid dissolving of the algicide. Special chutes have been installed to facilitate filling the hopper from 100-pound sacks stored aboard the boat.

The hopper was constructed in the Water Department shop and required approximately 48 man-hours. Total cost was approximately \$325.00.

Two men are required to operate the boat and fill the hopper. A set of material-handling conveyor tracks are used for unloading the truck. The cost of the conveyor tracks was approximately \$100.00.

Another piece of special equipment devised by Water Department personnel is a steel hopper and blower for application of small crystal copper sulfate. This hopper was also built in the Water Department shop at a total cost of \$200.00 and required two days to fabricate. This hopper is temporarily suspended from the bed of a truck carrying a skid-mounted compressor.

This device is used to apply chemicals to the 7-mile shoreline of the primary storage reservoir at Lake Youngs and the 1-mile shoreline of the Tolt Regulating Reservoir.

Two men can operate the equipment with one man driving the truck and one man attending the feeding of copper sulfate into the hopper. The coverage is very uniform and is rapidly applied. The speed of travel of the truck is the gauge used in determining the dosage applied.

This is the first of two articles on equipment available to contract applicators and others for application of chemicals to aquatic areas. Part II will appear in the April issue.
—Ed.

Bo-Rid Soil Sterilant in New Dry Form, Says Bogle

Bo-Rid soil sterilant weed and grass killer formulations are now appearing in a new, dry-pellet form, reports the R. H. Bogle Co., Alexandria, Va.

In its new form the layered configuration flows out as a white granular grit, easy to see and handle, the company says. The pellets hug the ground. Ground moisture works slowly to dissolve the pellet layer upon

layer, providing a long-lasting action for increased effectiveness.

Specifications describe the three main formulations: Bo-Rid 20H for initial kill of heavy problem vegetation; 20K for follow-up of pretreated areas or medium vegetation control; and 10H-15K for general weed and grass control in southern areas.

Data sheets covering these three formulations are available to interested readers who write to R. H. Bogle Co., Alexandria, Va.

VICHEM FUNGICIDES & HERBICIDES

for treatment and maintenance of fine turf



These specialty products, developed specifically for golf course and park use, are now available for the treatment and control of fine turf grasses. VICHEM research in agricultural chemicals has produced such outstanding developments as DSMA—DiSodium Methyl Arsonate; AMA—Ammonium Methyl Arsonate; CPA—Calcium Propyl Arsonate; CALAR—Calcium Acid Methyl Arsonate.

... the finest chemicals to protect your finest turf.

FUNGICIDES

LIQUIPHENE 10% (PMA)
THIAMURAM 75 (Thiram 75%)
THIAMURAM M (Thiram-Mercury)
MERCURAM (Thiram-PMC)
SURFACTANT:
958 WETTING AGENT

HERBICIDES

- for Crabgrass and weed control
CRAB-E-RAD (Powder) DSMA
SUPER CRAB-E-RAD (Liquid) AMA
SUPER CRAB-E-RAD + 2 (Liquid) AMA + 2,4-D
SUPER CRAB-E-RAD (Calar)
NEW CRAB-E-RAD 70 and 120 (Liquid) SMA
- for Dallisgrass control
DAL-E-RAD 100 (Powder) DSMA
SUPER DAL-E-RAD (Liquid) AMA
SUPER DAL-E-RAD + 2 (Liquid) AMA + 2,4-D
NEW DAL-E-RAD 70 and 120 (Liquid) SMA
SUPER DAL-E-RAD (Calar)

Distributor Inquiries Invited



VINELAND, NEW JERSEY

VINELAND CHEMICAL COMPANY

Manufacturing Plants: Vineland, New Jersey ■ Palmer, Puerto Rico

See Us at Booth 159



Dr. Peters: Northeastern Weed Control Conference has a "symbiotic relationship with industry."



Williams: "Make sure your equipment is adequate, your pump large enough."

presentation of new chemicals from industry, and talks on forestry and public health weed control. As usual, there were a number of research reports on turf weed management.

Since the new chemicals presented were almost identical with those discussed at the North Central Weed Control Conference in December, readers may turn to page 10 for a resumé of the presentation.

Watch Your Equipment!

A leadoff address during the first day's general sessions got down to brass tacks about how weed controllers should look after their application equipment. After all, the best herbicide known to man can fail if the spray rig or spreader is not working correctly, or is not operated with dexterity. This crucial topic was examined at length for the gathered weedmen by A. T. Williams, Chemical Sales Manager for Agway,

of inverts, or chemically thickened materials.

News of the latter came in a paper prepared by J. W. Suggitt and J.E.F. Winter, both of the Hydro-Electric Power Commission of Ontario, Toronto.

For several reasons, standard invert emulsions were unsatisfactory for the kind of spray program the Commission desired. "Recently one manufacturer," the Canadians reported, "has promoted particulate sprays intended to allow little herbicide drift. Small particles of a water-swellable polymer, dispersed in an aqueous herbicide solution from which they imbibe liquid, swell to some limited final size determined by the polymer used. With the addition of particles in sufficient quantity, essentially all the herbicide solution is taken up, with formation of a very thick, coarse, granular liquid much like tapioca."

Success was achieved with

Broadened Industrial Sessions Underscore Importance Of Nonfarm Weed Control at 19th Northeastern Weed Meet

In an urbanizing America, where fewer acres of farmlands now produce greater quantities of food, it's no surprise to find weed scientists increasingly concerned with urban/industrial vegetation control. This fact was brought out resoundingly again this year for a record 775 delegates to the 19th Annual Northeastern Weed Control Conference convention at the Hotel Astor, New York City, Jan. 6-8.

In his keynote address, outgoing president Dr. Robert A. Peters cited not only the growth in importance of weed control in general, but the phenomenal rise of nonfarm vegetation maintenance technology. Dr. Peters, of the Plant Science Department, University of Connecticut, Storrs, said the NWCC has from the outset maintained a "symbiotic relationship" with industry, and this year devoted more time than ever before to railway, highway, utility, and other forms of industrial weed science.

Other highlights of the 19th meeting included an expanded section on aquatics, a detailed

Inc., giant supplier complex headquartered in Syracuse, N. Y.

Williams concluded with a summary of what the successful application program should have, and included closed tanks, long-wear nozzles, and sufficiently large pumps in his recommendations.

Scan Helicopters/Spray Drift

More and more attention each year is being given to use of helicopters for herbicide application, and the development of thicker sprays, either as a result

such a mixture, applied from a spray-boom-equipped helicopter, for the control of woody growth in transmission line rights-of-way. Spray drift is largely avoided, even with crosswinds of up to 7 mph, and adequate coverage of foliage is obtained at a substantially reduced cost, the researchers indicated.

One of the invert-emulsion application methods currently much in the news at weed conferences is the Rhap-Trol Spray System, a product of Hercules Powder Co. According to Dr.

New head of the Northeastern Weed Control Conference Dr. G. D. Hill (center) was congratulated by a visitor from Wilmington, Delaware, Dale E. Wolf (right). Wolf is president-elect of the Southern Weed Conference, and both Dr. Hill and he are duPont men. Dr. John Meade, NWCC secretary-treasurer, looked on happily.



Weed-choked pond?



FIGHT BACK! WITH ORTHO!

In just ten days, new ORTHO Diquat can give you a clean, weed-free pond



New Diquat makes short work of the common water weeds—water lettuce, water fern, pondweed, coontail, Southern Naiad, water hyacinth and Elodea. Diquat is easily applied by spraying or injection under the water surface. The weeds absorb it, and quickly wilt, collapse and die. (For free-floating weeds, use a standard sprayer.)

Diquat is non-hazardous, used as directed. It would take 20 times the maximum recommended dosage to be at all harmful to fish. It's inactivated immediately on contact with soil, and it doesn't build up in water. In just 10 days (be sure to follow label directions), you can have clear, clean water for irrigation, watering your animals, swimming, or even a fishing hole.



"Helping the World Grow Better"

CALIFORNIA CHEMICAL COMPANY, ORTHO DIVISION, 200 Bush St., San Francisco 20, California

ON ALL CHEMICALS, READ CAUTIONS AND DIRECTIONS BEFORE USE.

T.M. REG. U.S. PAT. OFF. ORTHO, HELPING THE WORLD GROW BETTER

When Writing to Advertisers Please Mention WEEDS TREES AND TURF



New vice president of the Northeastern Weed Control Conference, Dr. Richard D. Ilnicki (left) was surprised by the camera while being congratulated by Lloyd Warner of Elanco Products.

Lyle Hill, in charge of the product for Hercules, the Rhap-Trol technique uses a bifluid nozzle to apply an invert emulsion of a very high yield point. With this high yield point, achieved in the nozzle chamber as the emulsion is formed and sprayed, the wind, be it from the speed of an aircraft or from a fan, will not cause the droplets to break up after they are formed until they reach the weed. Dr. Hill sees a growing range of applications for inverts in general.

What the Railways Need

As part of the expanded industrial sections of this year's conference, delegates heard railway vegetation maintenance and control expert Charles F. King tell what America's rail companies need in weed and brush service.

King is assistant engineer, Chesapeake and Ohio Railway, Huntington, W. Va.

There were three primary points in King's address: (1) railroads need more help from chemical suppliers and applicators in selling management on the need for a greater chemical expenditure to combat the loss of hand labor; (2) railways should have an active joint agency to keep tabs on pending state, county, and local vegetation control legislation; (3) the railway industry needs more active and objective information sources on vegetation control.

Highway executives, too, are faced with constantly increasing funds of knowledge about vegetation control. One interesting and somewhat offbeat concept was presented by E. F. Button, agronomist with the Connecticut State Highway Department.

Button wanted to test soil sterilant-tar mixtures, used for spraying under guide rails. He found that a liquid-formulated soil sterilant (Urox from General Chemical) can be mixed with a tar for application under guide rails for effective weed control, eliminating the traditional spray crew. Furthermore, either the sterilant, or more probably the "oil-carrier" of the liquid-formulated soil sterilant, appears to be beneficial in extending the "elastic" life of tar applied over a heterogeneous soil surface under conditions where there is no vehicular traffic to "knead" the tar.

"One might speculate," Button concluded, "that additions of this type of sterilant to tars and possibly asphalts for shoulder work, or for parking lots, might provide the benefits of weed control and extended pavement life."

"Flow Developer" Clears Ponds

Many authorities consider aquatic weed control to be the most challenging of all weed problems. Certainly the concept of chemically controlling aquatic plants has just come into its own in the last few years. With this growth in importance comes the development of revolutionary techniques for controlling water weeds. One such device is the "flow developer," which was explained to conference delegates by Jason M. Cortell, a consultant biologist and aquatic weed expert from Brookline, Mass.

Faced with growing contamination of Crystal Lake in Newton, Mass., researchers were able to determine that stagnation and lack of circulation contribute to a buildup in aquatic vegetation, algae, and bacterial contamination.

Cortell said discovery of this fact led to the invention of a mechanical flow developer. It consists of a 10-horsepower, submersible, electric motor with a propeller to generate water movement and create a current through the bathing area. Mounted on a floatable wooden platform, the flow developer is capable of displacing 2,000,000 gallons of water per hour.

Chemical treatments were later applied through the flow developer to control aquatic weeds; then copper sulfate was similarly introduced for algae control.

Also probing the subject of aquatic weed control were sev-



Pensive study of notes prepared these two speakers for their addresses. National Park Service official E. D. McClanahan (left) talked about weed control and turf management in the nation's recreation spots, while VPI researcher Dr. T. O. Evrard told of his experiments with invert emulsions of 2,4-D on highway weeds.

eral papers on current research using today's herbicides. At Virginia Polytechnic Institute's Agricultural Experiment Station, for example, researchers David L. Sutton, T. O. Evrard, and W. E. Chappell recently completed a series of tests with promising chemicals and those already standard to determine effectiveness of weed control chemicals in farm ponds. The research team established four major points:

(1) Simazine concentration of 0.5-4.0 ppm was effective in the control of *Potamogetons*, *Chara*, *Spirogyra*, and *Oedogonium*.

(2) White waterlilies were controlled by 2,4-D and 2,4,5-T at 15 lb./acre.

(3) Endothal plus silvex at 2 ppm controlled *Potamogetons*.

(4) Combinations of 2,4,5-T and amitrol, and 2,4,5-T and dalapon, were effective in the control of ditchbank plants, the VPI report concluded.

New Turf Herbicides Bow

In sessions on control of unwanted weeds in turf, several papers, mostly hinging on experimental testing with established and new compounds, were presented.

At the Connecticut Agricultural Experiment Station in Windsor, associate plant pathologist J. F. Ahrens tested the following preemergence crabgrass killers: Dacthal (Diamond Alkali); Zytren (Dow); Bandane (Velsicol); trifluralin with diphenatril (Eli Lilly); Benefin (Eli Lilly); Betasan (Stauffer); Azak (Hercules); Tok (Rohm &

(Continued on page 36)

In the Hudson Valley, Trees Stop Growing.



Poughkeepsie, New York: 2,000 trees in the mid-Hudson Valley cities of Poughkeepsie, Kingston, and Newburgh were sprayed with MH-30T* this summer in an extensive test conducted by the Central Hudson Gas & Electric Company. This test proved the effectiveness of MH-30T in controlling the regrowth of trees next to electric lines.

Central Hudson's arborist, Richard Abbott, reports on the results of this test: "When you add up the savings on pruning and brush disposal, MH-30T saved us anywhere from \$1.50 to \$3.00 per year on every tree we sprayed. Next year, we'll be treating more than 3,000 trees. This is going to be another step in our company's efforts to continue reducing line clearance costs."

MH-30T

Read about this revolutionary chemical that controls the growth of trees without harming them in any way.

An amazing chemical can save utility companies millions of dollars a year by drastically reducing the need for large-scale pruning. This chemical is called MH-30T.

MH-30T actually stops cell division in trees (this is what makes trees grow). You can use it to control the growth of an entire tree. Or, just the section interfering with electrical wires. MH-30T does not harm the tree in any way. The rate of regrowth is substantially slowed

down but branches get sturdier and keep on producing leaves.

MH-30T has already been applied successfully to thousands of trees. It's been proven effective on at least twenty different species of trees. In most cases, MH-30T will allow at least an additional year in the trimming cycle before re-pruning is necessary. This can mean significant savings.

If you'd like to know more about MH-30T, simply fill out the coupon and mail it to us.

*MH-30T is U.S. Rubber's registered trademark for its maleic hydrazide.

Chemical Division
UNIROYAL
U.S. RUBBER

U.S. Rubber, Chemical Division,
Dept. W2, Naugatuck, Conn.

I understand that MH-30T is for commercial use only.
Please send me your illustrated brochure showing how MH-30T can reduce pruning costs by one-third or more.

NAME _____
FIRM _____ TITLE _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

Broad Program, Florida Sunshine, Beckon Nation's Arborists to Meeting Feb. 14-16

A program of informative subjects to be presented by field specialists and industry representatives has been prepared for delegates to the 1965 winter meeting of the National Arborist Association, assembling Feb. 14-16 near St. Petersburg, Fla. Headquarters for this annual event is the Guy Lombardo Port O-Call Inn, Tierra Verde.

Initial business functions will be held Sunday with a meeting of the association board and finance committee. The rest of the day will be dedicated to an informal get-together as delegates arrive.

The program for the discussion periods of the next two days includes the following topics:

"Shade Tree Insect Research on New Approaches to Control," by Russell R. Whitten, chief, Division of Forest Insects, U. S. Forest Service, Central States Forest Experiment Station, Columbus, Ohio.

"A Diversified Tree and Landscape Service," will be presented by Edwin and Jane Smith, of Smith Tree and Landscape Service, Lansing, Mich.

"Safety, an Everyday Problem for the Tree Company," is the

subject offered by a representative of the Blume System Tree Experts, Houston, Texas.

Something new in equipment is explained in the talk, "A New Tree Mover," by Carl E. Boat, of Vermeer Mfg. Co., Pella, Iowa.

"Report on Association Advertising," by John Duling, Duling Tree Expert Co., Muncie, Ind., and "Trees and Gardens of Foreign Lands," by Lenore and Henry Vaughn Eames, Stockton, N. J., are other topics to be presented to the delegation. Maple tree disease problems and effects

of drought, and what the utility company expects of the contractor are also on the agenda.

A panel discussion focused upon "Costs and Pricing of Tree Operations," is composed of the following: "Tree Moving and Planting," William Rae, Frost & Higgins Co., Arlington, Mass.; "Pruning and Fertilizing," Edwin E. Irish, Chas. F. Irish Co., Detroit, Mich.; "Spraying, Cabling and Rodding," William P. Lanphear III, Forest City Tree Protection Co., Cleveland, Ohio.

Winston E. Parker, Moorestown, N. J., president of the association, says that owners and managers of all tree service companies are welcome to attend the meeting.

Midwest Regional Turf Conference To Assemble at Purdue, March 1-3

An extensive program for turf managers in every field, including golf courses, sod nursery producers, and general landscape and lawn maintenance, has been keyed to "space-age thinking" for the Midwest Regional Turf Conference scheduled by Purdue University, Lafayette, Ind., March 1-3.

To amplify the conference theme, "Space for Growing Turf," the following seven talks are slated: "Space and Turf Growth—An Introduction," by F. V. Grau; "The Particles of Soil—Clay," J. L. White; "The Space Between Particles," H. O. Kohnke; "The Size of the World Today," E. L. Butz; "Infiltration and Soil Surfaces," J. V. Mannerling; "Moisture Storage and Delivery," D. Wiersma, and "Turf—The Integrator of Space and Water," J. R. Watson.

Bluegrass Interest High

"Bluegrass Research Progress," a talk by C. Berry, will give up-to-date information about this highly popular species. Looking to the future, John Long will present his topic "Bluegrasses—Today and Tomorrow," to give those present a perspective of what is in store in the years ahead.

To those associated with golf courses, discussions on development of bluegrass on fairways, protection from competition, from damage and from drought will be presented by several specialists.

Sod nurserymen will also hear a bluegrass topic directed to them: "Bluegrasses — Varietal Performance," by J. Long. Another talk by B. Warren will cover good seed or vegetative varieties.

Turfmanagers can compare their experiences with those who will present talks based on experience with unwatered areas, manually watered areas, and automatic operations.

Advance Registration Urged

For the last four years, attendance at the Midwest Regional Turf Conference has averaged over 600. Officials request advance registration, but those who are uncertain whether they will be able to attend can register the morning of March 1.

Complete information, a copy of the program, and registration, may be obtained by writing to W. H. Daniel, Department of Agronomy, Purdue University, Lafayette, Indiana.

Southern Turfgrass Conference Meets Feb. 22-23

"Better Turf Through Better Maintenance," will be the theme of the 1965 Southern Turfgrass Conference meeting in the Hotel Peabody, Memphis, Tenn., Feb. 22-23.

Discussion programs are designed to provide the best information on all phases of better turf maintenance. Ten noted speakers will present the most recent developments in turf maintenance and related functions. A question and answer period will follow each talk.

A banquet, entertainment and other activities are included in the conference program.

Here's how easy it is to get long-lasting control of nematodes and soil insects that ruin turf

- A single spray of Nemagon® Soil Fumigant kills root-choking nematodes all season.
- A single application of dieldrin insecticide controls root-pruning insects for years.

THE FACTS that follow quickly explain the essential value of controlling soil pests with Nemagon and dieldrin; their flexibility and ease of use; why the root protection they provide far outweighs the cost of treatment.

Nematode control with Nemagon

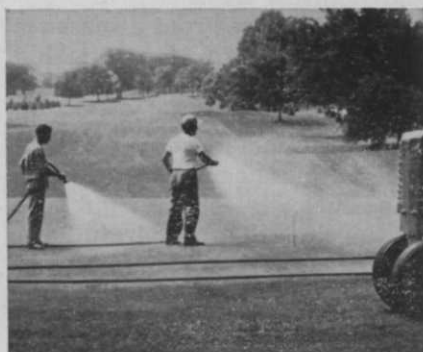
Nemagon works as a pre-planting application or on established turf. It fumigates the root zone to kill the nematodes (microscopic worms, not insects) that can infest soil in fantastic numbers. All damaging species are controlled and reinfestation will normally not occur for a year or more.

Without the root knots and lesions caused by nematodes, water and soil



A Nemagon spray knocks out nematodes fast, and thoroughly. Turf isn't disturbed. And nearby plants won't be injured.

nutrients can pass freely through roots. Turf can respond fully to fertilizer and irrigation. Risk of stunting, poor appearance and dead patches is eliminated. So is the risk of a reseeding or



Protecting a golf green with Nemagon eliminates any chance of unsuspected nematode infestation causing costly damage and disrupting play.

resodding.

Nemagon is easily drenched into soil following a spray application. There's no need for special equipment and grass isn't disturbed. Easy-to-follow directions are printed on every package.

Soil insect control with dieldrin

Dieldrin controls all species of grubs, including the larvae of Japanese and June beetles. It can be used ahead of time to prevent damage from ever starting. Or you can apply dieldrin to stop an infestation when discolored turf indicates that soil insects are pruning roots and limiting the crop's access to fertilizer and water.

Dieldrin can be applied any time after soil warms up. Effectiveness usually lasts 3 to 5 years. Control is so thorough that grub-eating moles and rodents can't find food in the treated area and leave.

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

Full details on using dieldrin for



This root-chewing white grub can kill turf or make it look sick. So can a host of other grubs and soil insects. Dieldrin stops them all.

control of soil or surface insects are on every package label.

Nemagon and dieldrin are both available as branded products of well-known manufacturers and sold where you normally buy insecticides, and other turf maintenance products.

For more information, write Shell Chemical Company, Agricultural Chemicals Division, 110 West 51st St., New York, New York 10020.

Follow label directions carefully when using any pesticide.

Shell Chemical
Company
Agricultural Chemicals Division





Scholarship worth \$400 was presented to Roy L. McClung, Jr. (right), senior agronomy major at Texas A&M University by Dr. Gene C. Nutter, past Executive Director of the Golf Course Superintendents of America. The GCSAA awards the scholarship to deserving students.

Need for Professional Turfmen Growing, Texas T-G Meet Hears

From 10,000 to 12,000 trained men will be needed to meet manpower requirements for the U.S. turfgrass industry in the next 10 years, Dr. Gene C. Nutter told the 19th annual Texas Turfgrass Conference at Texas A&M University, State College, Dec. 7-9.

Nutter said more and more young men in agricultural schools are taking interest in turf, but not nearly enough.

Precautions for using pre-emergence herbicides in turf came from L. L. Stitt of Velsicol Chemical Corp. in Chicago. Stitt recommended turf managers test each chemical on a small plot to see what it will do under local conditions, and keep a record of the tests.

About 200 persons attended the conference, which is jointly sponsored by the Texas Turfgrass Assn. and Texas A&M University.



Update on turfgrass research came from this pair of experts: Dr. Wayne Huffine (left) of Okla. State, and Velsicol's Lloyd L. Stitt.

Tree Root Diseases

(from page 14)

phloem necrosis virus, are found in roots.

Bacterial crown gall, more unsightly than destructive, attacks roots. The troublesome *Verticillium* wilt fungus enters through roots. The shoe string root rot from *Armillaria mellea* is a common disease more often suspected than found. So is the *Fomes annosus* root rot of evergreen trees.

Pines are subject to a root and butt rot caused by *Polyporus schweinitzii*. Species of *Xylaria*, *Daedalea*, *Daldinia* and *Phytophthora*, to name a few important genera, can kill roots and eventually entire trees.

The list of tree root diseases is long. The record of practicable control methods is sadly lacking.

The best that can be done to reduce the incidence of root diseases is to use concentrated common sense. Select the right tree for the site. Plant it carefully in well-drained soil (for most species). Provide adequate nutrients and water. Give it space to grow—in three dimensions. Use the available fungicides, nematocides, and insecticides where necessary.

Most of all—sponsor a program of tree root disease research in federal, state, and private institutions where the science of plant pathology is being pursued. Perhaps, before we expect it, a scientist will come up with a systemic root treatment that will assure healthy roots for all the shade trees of the future. Why not?

Georgia Weed Control Society Set for Macon Feb. 24-25

Recommendations and reports from participants in the 1964 Georgia Clean Acres Weed Control Program will be of singular interest to members of the Georgia Weed Control Society when they gather in Macon, Feb. 24-25, at the Dempsey Hotel.

The reports will reveal results of the society's initial statewide project, a broad educational pro-

Meeting Dates



Michigan Association of Nurserymen, Annual Meeting, Pantlind Hotel, Grand Rapids, Feb. 9-11.

Aquatic Weed Control Society Annual Meeting, LaSalle Hotel, Chicago, Ill., Feb. 11-12.

National Arborists Association Winter Meeting, Guy Lombardo's Port-O-Call Inn, Tierra Verde, Florida, Feb. 14-16.

International Shade Tree Conference, Canadian Chapter, 16th Annual Meeting, Chateau Frontenac Hotel, Quebec City, Feb. 18-19.

International Shade Tree Conference, Southern Chapter, Meeting, Francis Scott Key Hotel, Frederick, Md., Feb. 21-23.

Southern Turf Grass Assn. Meeting, Peabody Hotel, Memphis, Tenn., Feb. 22-23.

Georgia Weed Control Society Meeting, Dempsey Motor Hotel, Macon, Feb. 24-25.

Midwest Regional Turf Foundation Meeting, Purdue University Memorial Center, Lafayette, Ind., March 1-3.

Wisconsin Park and Recreation Society, 34th Annual Meeting, Northland Hotel, Green Bay, March 10-12.

35th Annual Michigan Turfgrass Conference, Kellogg Center, Michigan State University, East Lansing, March 11-12.

Florida Turf-Grass Assn. Meeting, Sheraton Hotel and Plantation Field Laboratory, Ft. Lauderdale, May 6-7.

Florida Nurserymen and Growers Assn. Meeting, Sheraton Hotel, Ft. Lauderdale, May 13-15.

Alabama Nurseryman's Assn. Meeting, Admiral Semmes Hotel, Mobile, June 6-8.

gram aimed at weed control primarily in agricultural production, and extended in modified form through extension organizations to include lawn, turf, industry, parks and highway weed control.

An equipment and products display by manufacturers is planned for this event. For details, write James F. Miller, Extension Agronomist—Weed Control, University of Georgia, Athens.

WHY

From The R. H. BOGLE Company comes the versatile DRY weed and grass killer with lasting power—BO-RID® a new name for an old & respected name in chemical herbicides

WEED CONTROL?

- Ends the hazard of weed-spread fire.
- Exposes weed-hidden dangers.
- Improves work safety.
- Eliminates costly weed-cutting.
- Drives vermin away.
- Improves appearance, sanitation, and drainage.
- Reduces metal corrosion and wood decay.

DRY WEED CONTROL?

- No mix, no mess, no spray, no expensive equipment.
- No fire hazard; no corrosion, no vermin.
- High residual action.
- Non-selective; kills all.
- Easy to apply and store.
- No metal corrosion and wood decay.

BO-RID® DRY WEED CONTROL?

- Controlled quality, dust free, low cost.
- White pellets cling to ground, assure uniform distribution.
- Regional formulation, corrected for soil, vegetation, rainfall and season.
- Standard of application rate 200 lbs. per acre (1 lb. covers 218 square feet).
- Proven effective—non-specific—controls all vegetation.



FOR THESE RESULTS!....



*One of fifteen formulations

THE R. H. BOGLE COMPANY ALEXANDRIA, VIRGINIA 22313 (703) 549-2344
MEMPHIS TENN. JACKSONVILLE, FLA.

Experts at Va. Conference Dec. 8-10 List Fungicides, Insecticides for 200 Delegates

By F. H. TITLOW, Associate Extension Editor, Virginia Polytechnic Institute, Blacksburg

More than 200 manufacturers, distributors, dealers, contract applicators, and others heard pesticide experts from Virginia Polytechnic Institute and other locations list effective pesticides for turf and ornamentals during a special Virginia Pesticide Conference Dec. 8-10 in Roanoke.

Meeting at Hotel Roanoke, the assembled pestidiers were filled in on a broad-spectrum program with how-to-do-it-advice on almost every weed, turf, and tree maintenance problem.

One discussion concerned the use of fungicides on turf. VPI's Dr. A. S. Williams recommended such chemicals as Dyrene, Calo-Clor, and Tersan OM for control of snow mold, which is expected to be a problem in Virginia turf this spring.

Dr. J. O. Rowell, VPI entomology professor, said a single insecticide such as chlordane can control a variety of pests, including the larvae of May beetles and green June beetles, as well as sod webworms, armyworms, cutworms, mole crickets, and others.

Control of insect and disease pests which attack ornamentals was analyzed by VPI's Dr. R. H. Gruenhagen, who reminded delegates that it is costly to replace ornamental plantings.

In specific recommendations, Dr. Gruenhagen said Ferbam is effective against cedar-apple rust, while the antibiotic cyclohexamide is excellent for the cedar gall stage but is not as good on the apple rust stage of the malady.

"Dicamba is particularly useful for control of knotweed, whiteclover, chickweed, red sorrel, and curly dock," according to Dr. S. W. Bingham, of VPI.

"For annual grassy weeds, there is a wide selection of herbicides available," Dr. Bingham said. "Dacthal, Betasan, Zytron, and Bandane are among those used successfully in lawns prior to crabgrass emergence. DMA, PMA, AMA, and CMA are effec-

tive postemergence materials for crabgrass control; however, some temporary discoloration of desired turf occurs and lasts for 2 to 4 weeks."

This was the group's first meeting, and they formed a new Virginia Pesticide Association.

New Antidrought Compounds for Turf Examined During New Eng. Ag. Chem. Conference Dec. 9-10

Antidrought compounds may have some significant application in the turf industry, more than 150 delegates heard during the annual New England Agricultural Chemicals Conference and Workshop, New Hampshire Highway Hotel, Concord, N.H., Dec. 9-10.

Antidrought and antifreeze compounds, potentially useful to the horticulturist, were described by Pieter Kuiper of the Connecticut Agricultural Experiment Station at New Haven as part of a program that included experts on virtually every phase of agricultural chemical research and application.

R. E. Johnson, Richmond, was named president; Robert Pretlow, Franklin, is vice president; J. W. Marshall, Charlottesville, will serve as secretary; and Harvey Carpenter, Jr., Mitchell, is treasurer. Officers were installed during the banquet where well-known Dr. R. H. White-Stevens, formidable opponent to antipesticides, spoke on the value of pesticides. He's from the agricultural research operation of American Cyanamid in Princeton, N.J.

Kuiper said most research on the antidrought compounds, such as decenylsuccinic acid, showed that when normally cold- or drought-sensitive plants were treated with the chemical, they could withstand significant stress.

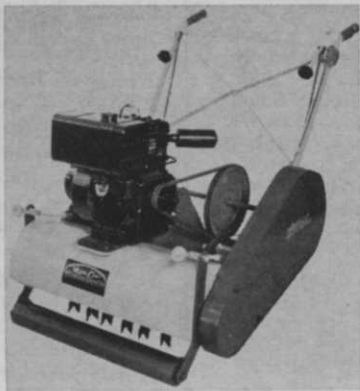
Theodore R. Flanagan, Extension Weed Specialist at the University of Vermont, Burlington, told WTT that the annual conference changes its emphasis each year, but that the constant purpose is to furnish the latest information on pesticide use to those immediately in contact with the ultimate consumer, including contract applicators, representatives from industry, golf course superintendents, etc. Those interested in attending next year may write Flanagan for further details.



Pesticide experts gathered to discuss problems in usage peculiar to New England. Left to right are: H. D. Kerr, turf weed researcher from USDA's Beltsville, Md. complex; A. Hawkins of the Univ. of Conn., Storrs; C. C. Compton, Rutgers Univ., New Brunswick, N.J.; J. J. Jernigan, Federal Extension Service; conference co-chairman Howard; and Oscar L. Wyman, Soule Glass and Paint Co., Bangor, Me. During the meeting the New England Agricultural Chemicals Conference and the New England Herbicide Workshop, previously separate organizations, were combined. New chairman is Extension Weed Specialist Theodore R. Flanagan of the University of Vermont, Burlington. New vice chairman is Ed Cooper of Allied Chemical Corp.'s General Chemical Division; Dr. C. A. Langer of the University of New Hampshire Horticulture Department is secretary-treasurer.

THE WAY to BETTER TURF

Vertical cutting blades of the VG-2 Landscape Verti-Groove slice into turf to remove thatch and excess lateral growth. Water, fertilizer, chemicals reach soil surface.



Verti-Cut®

The Aerifier® spoon scoops out cores of soil in a cultivating action. "Storage wells" made by spoons allow water, fertilizer, chemicals to penetrate to root zone. Roots flourish — grass flourishes.



Aerify

WEST POINT PRODUCTS CORP., West Point, Pa.

HARDER ARBORIST SUPPLY CO.

... A NAME YOU CAN TRUST

for

- Quality Tools, Supplies, and Equipment
- Reliable, Economical Prices
- Dependable Service and On-Time Deliveries

Order now from our complete stock of famous brand supplies and equipment:

Seymour-Smith • Oregon Bars, Chains and Sprockets • Bashlin • Greenlee • Collins • Cabot • Fanno • ORTHO® Brand Insecticides • Solo Saws • Skil • Plymouth Rope • U. S. Rubber Hose • Barway Fittings • And many others

FOR QUALITY... DEPENDABILITY... RELIABILITY... choose...



Write for FREE Harder Arborist Catalogue

1 M. Reg. Pat. Off.

P. O. Box 111, Hempstead, N. Y.

Let **Myers** Show You... the Sprayer with the VERSATILITY that pays off!



Myers DU-ALL Sprayers are the pick of professional applicators. Why? Because DU-ALL Sprayers provide the versatility that is so important for the many different spraying jobs a professional applicator is called upon to perform.

In the Myers DU-ALL Line, you can choose from wheel or skid-mounted models, pumps from 2-10 gpm and tanks in 150 or 200 gallon sizes. Boom attachments, guns and many other accessories are available as optional equipment. Myers also offers a full line of other sprayers that feature pumps with 2 to 50 gpm capacities, pressures to 800 lbs. and tanks in 12½ to 1,000 gallon sizes.

Make the most of your equipment investment by specifying Myers. For complete information and help in making your choice of spray equipment, see your Myers Sprayer Dealer.

Myers

...the finest name in power sprayers

The F. E. Myers & Bro. Co.
ASHLAND, OHIO / SUBSIDIARY OF McNEIL CORPORATION

Classifieds

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

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

POSITION WANTED

CAN YOUR ORGANIZATION USE a reliable man with a B.S. in horticulture and 20 years' experience in turf-grass and landscape management and sales? I'm ready to go to work now! Prefer northeastern United States. Write Box 6, Weeds Trees and Turf magazine.

HELP WANTED

BRANCH MANAGERS, Connecticut through Virginia. To head operations for progressive national corporation specializing in professional management of turf, shrubs and ornamentals. Education, experience and/or interest in turf, horticulture or related fields desirable. Expert sales and technical training by top men in the field. Extraordinary opportunity for advancement. Excellent starting salary plus substantial commissions. Must be willing to relocate if necessary. Send resumé to: Charles W. Ridinger, Director of Personnel and Training, Turf Kings, Inc., 46 John St., Yonkers, N.Y. 10702.

SALES MANAGER: We need a man experienced in sales of professional turf, shrub, and tree maintenance. Duties will consist of the organization and control of a 6-man sales team in the Minneapolis-St. Paul area. Compensation will consist of generous salary, profit sharing, and ownership interest. We want someone interested in building for himself through a truly professional approach to this business. Send complete resumé to R. J. Hultgren, 5428 Nicollet, Minneapolis, Minn. 55419.

FOR SALE

TREE SPRAYING BUSINESS — Western Suffolk County, L. I., N. Y. 1960 International truck, excellent; 500-gallon tank; 60 gpm piston Hardie pump; 500 ft. of 1/2" and 3/4" high-pressure hose. Five hundred spraying customer contracts. Write Box 5, Weeds Trees and Turf magazine.

Northeastern Conference

(from page 28)

Haas); and duPont's new Tupersan.

Betasan was very effective in 1963, but was less so in 1964 when the interval between treatments and rainfall was greater, Dr. Ahrens said.

Azak at 10 and 10.5 lbs. per acre controlled crabgrass effectively in 1963 and 1964, with slight-to-moderate injury to red fescue from the 1963 treatment. Benefin and Tupersan appeared safe and very effective on the established turf in 1964. Tupersan also seems promising for use on newly seeded bluegrass.

In similar tests at the New Jersey Agricultural Experiment Station, delegates learned, turf investigators Ralph E. Engel and Richard D. Ilnicki checked an almost identical group of chemicals. Materials these New Jersey experts favor are Azak, Betasan, and Tupersan.

As usual, the fabric of the Northeastern Weed Control Conference was too varied and richly textured to report on in full on these pages. But readers can get a copy of the *Proceedings*, which contains all the talks, for \$4.50 from Dr. John A. Meade, secretary-treasurer, Northeastern Weed Control Conference, Department of Agronomy, Uni-

Advertisers

INDEX TO ADVERTISEMENTS

Amchem Products Corp.	20a, 20b, 20c, 20d
The R. H. Bogle Co.	33
Bowie Machine Works, Inc.	7
California Chemical Co., Ortho Division	27
W. A. Cleary Corp.	37
E. I. du Pont de Nemours and Co., Inc. ...	3, 4th Cover
Geigy Agricultural Chemicals	11
Harder Arborist Supply Co.	35
Hercules Powder Co.	3rd Cover
Homelite Division	22
Ideal Crane Division	36
The F. E. Myers & Bro. Co. ...	35
Niagara Chemical Division, FMC	4
Pennsalt Chemicals Corp. ...	14
Phelps-Dodge Refining Corp.	38
B. G. Pratt Co.	23
Seymour Smith & Son, Inc. ...	14
Shell Chemical Co.	31
Smith-Douglass Co.	5
Tennessee Corp.	6
Union Carbide Corp., Chemicals Div.	15
U. S. Rubber, Chemical Div.	29
Velsicol Chemical Corp. ...	37
Vineland Chemical Co.	25
V-C Chemical Co. ...	2nd Cover
West Point Products Corp. ...	35

versity of Maryland, College Park.

Elected to head the weed profession's organization next year was Dr. G. D. Hill, of the E. I. duPont de Nemours experiment station, who was named president. Dr. Richard Ilnicki is the new vice president. He's from the New Jersey Agricultural Experiment Station in New Brunswick.

ONE-MAN HYDRAULIC CRANE

Comes complete with truck mount and 6-ft. chain. Can be mounted on any type truck. Accessories include Nylon Adjustable Tree Sling, \$27.50; Barrel Chain, \$4.95; Stiff Leg for use under truck bumper, \$9.95. Floor Dolly shown only \$99.50. Crane is interchangeable from dolly to truck mount.

1500-Lb. \$119.50 2500-Lb. \$169.50
Capacity Capacity

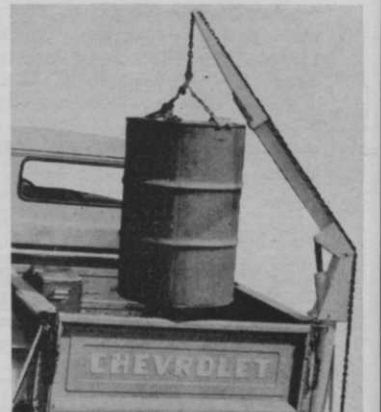
Sold on Guaranteed Performance basis or money back.

If check accompanies order we pay freight to your door. Call collect to place your order.

IDEAL CRANE

DIVISION BERT PARKHURST & CO.

15051 East Admiral Pl. Tulsa 18, Oklahoma
Telephone: 918 + GE 7-3313





**CLEARY
PRODUCTS**
for
**BETTER
TURF**

PMAS

The Dual Action Control . . .

for BOTH Crabgrass and Turf Disease

MCPP For weed control on bentgrass greens and fairways; bluegrass and fescues.

SPOTRETE 75% Dry Thiram Fungicide.

CADDY Liquid Cadmium for Turf Disease.

METHAR Lightest concentration of DSMA-Disodium Methylarsonate for Crabgrass and Dallisgrass in both liquid and powder.

PM2,4-D Phenyl mercury-2,4-dichlorophenoxy-acetate for selective weed control.

ALL-WET makes water "wetter" for better penetration in all turf areas, especially thatched or compacted spots.

AMA2,4D Amine Methylarsonate plus 2,4-D liquid for Dallisgrass and weed control.

THIMER A broad spectrum fungicide, containing Thiram and Organic Mercury in wettable form; in pre-measured canisters.

AMA Amine Methylarsonate, liquid, for Crabgrass and Dallisgrass control.

25% GRANULAR CHLORDANE Pre-emergence control of Silver Crabgrass, grubs, insects.

**W. A.
CLEARY**
CORPORATION

New Brunswick, N. J.

Belleville, Ont., Canada • Skokie, Ill.

This is **WHITE GRUB DAMAGE.**

For the answer to it and other summer turf problems, see below:



White grubs and Sod webworms. For long-lasting protection from these and other turf insects apply Chlordane. Gets rid of moles and skunks, too.

Brown patch and Dollar spot (bluegrass). Apply Velsicol® "2-1" for effective, economical prevention or cure of these and other turf diseases. New formula provides improved wettability, better stability, and less foaming action.

Gray leafspot and Fairy ring. Velsicol® Memmi .8EC protects warm and cool season grasses from these and other turf diseases. Memmi .8EC is a liquid mercurial fungicide—mixes in minutes, needs no constant agitation, won't clog nozzles, leaves no sediment in spray tank!

Mouse-ear chickweed and Knotweed. Banvel® D 4S attacks weeds through leaves and roots, kills most species found in turf. Works in warm or cold weather!

Plantain. Banvel® D+2, 4-D combines the effectiveness of Banvel with reliable, versatile 2, 4-D to give you one-application control of practically every broadleaf weed found in turf. Saves time—gets the job done quicker at lower cost!



ask
Velsicol

VELSICOL CHEMICAL CORPORATION
341 EAST OHIO ST., CHICAGO, ILL. 60611

Gentlemen: Please send me your new Turf Chemicals catalog. WT-25

NAME _____
ORGANIZATION _____
ADDRESS _____
CITY _____
STATE _____

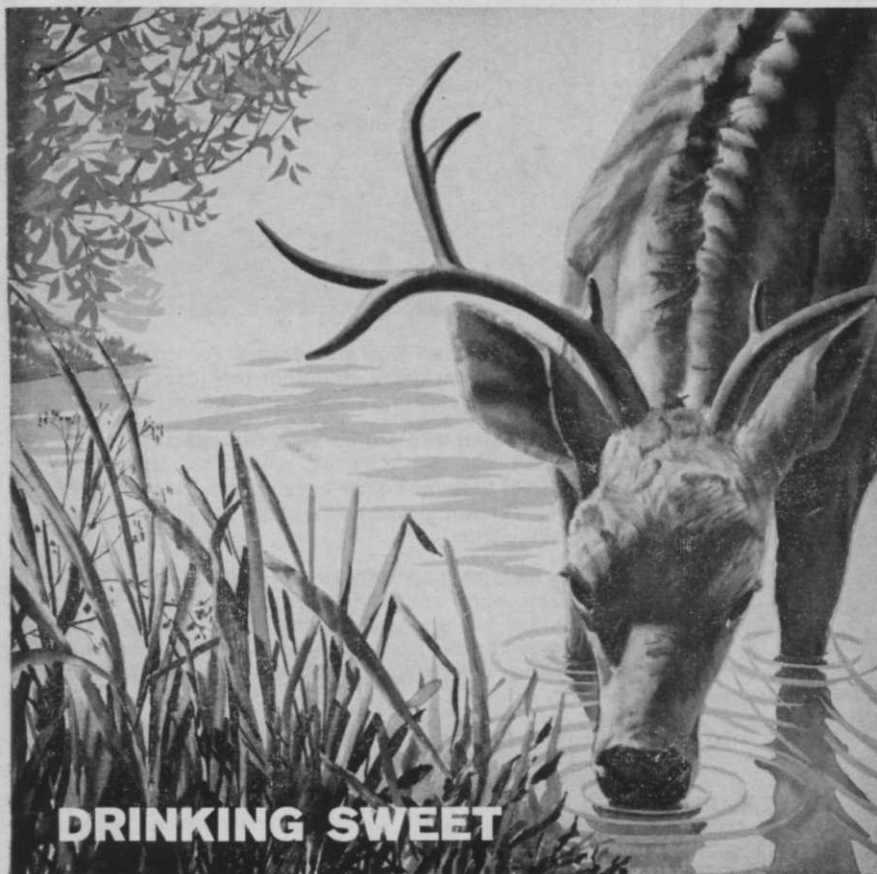
Roussel to Produce, Market Turf Product Line in USA

A broad line of turf management products will soon be marketed in America by Roussel Corp., a large European pharmaceutical and agricultural chemical house with sales and production facilities in over 70 countries.

Included in the line will be turf fungicides such as Thiram 75 and PMA, a roster of liquid and powdered herbicides (both

post- and preemergence), and a wetting agent, according to Gustave Hulkower, general manager of Roussel's agricultural chemical division in the United States.

Roussel's products will be available to the trade through recognized turf maintenance distributors. Those who desire more information may write to Gustave Hulkower, General Manager, Agricultural Chemical Div., Roussel Corp., 155 East 44th St., New York City, N.Y.



DRINKING SWEET

TRIANGLE BRAND COPPER SULFATE

applied regularly, destroys algae and microscopic organisms that cause scum, odor and bad taste in water supply systems. It helps to keep water "drinking sweet." ■ Triangle Brand Copper Sulfate also can be used to disintegrate some water weeds where they grow. They do not float downstream to clog waterways. ■ In sewage pipes and storm drains, this dependable product removes fungi and slime. It also controls root growth without harming trees. ■ Triangle Brand Copper Sulfate is economical, safe, and easy to use. Write to Phelps Dodge for information on: (1) "The Use of Copper Sulfate in the Control of Microscopic Organisms," (2) "Copper Sulfate for Root and Fungus Control in Sanitary Sewers and Storm Drains."



PHELPS DODGE REFINING CORPORATION

300 PARK AVENUE ■ NEW YORK 22, NEW YORK



Trimmings

Red Banks. Ed Banks may have ended up with a slightly red face when a news item last fall accused him of being unable to spell "poa annua" but he's probably glad to get some attention to the fact that the weed had invaded the greens on the Los Altos Golf Course in Albuquerque, N.M. Ed, manager of the course, submitted his financial report last November with a letter attached in which he complained that invasion of the weed had strained his work crews and caused him to have to resod many sections of his greens. But he was so wrought-up, it seems, that he misspelled the name and the papers picked it up as a "human interest" item which our clipping service later sent us. In any case, when the mistake was pointed out, Ed said, with righteous indignation, "We might not be able to spell it, but we sure can cuss it!" We're sure Ed has succinctly expressed the sentiments of our golf course and turf management readers everywhere!

* * *

Schread Moves Ahead. John C. Schread, a 35-year veteran on the entomology staff of the Connecticut Agricultural Experiment Station, has received the Connecticut Nurserymen's Association Man of the Year award. John's well known to New England turf managers as an authority on insect control in lawns and fine turf areas, and ornamentals. We join the Connecticut industry in doffing our hat to this hard-working entomologist who has done much to benefit the field.

* * *

Out of the Frye Plan. A contract applicator who's made tremendous strides in the general field of vegetation maintenance and control since we first met him several years ago is H. E. Frye, president of Frye Lawn and Garden Service in Raleigh, N.C. Homer was attending a convention about four years ago when he first got interested in broadening out his line of services and we had the privilege of talking to him then. Now we learn from a copy of his advertising flyer that the company has a line of contract services that includes shrubbery planting; tree and shrubbery pruning; dormant spraying, insect, disease, weed control; and fertilizing. He even includes custom mowing in his complete maintenance service, and has two college-trained men in charge of the operation.

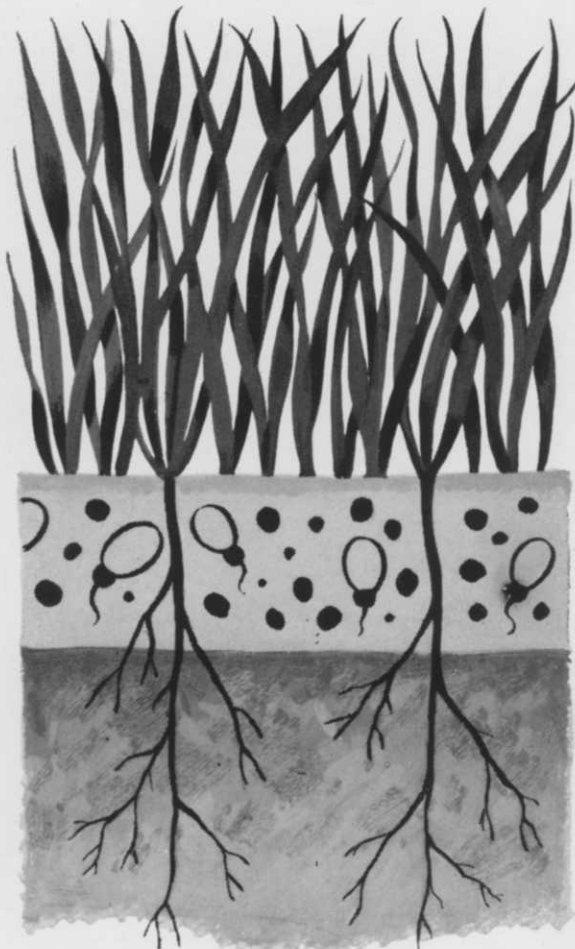
* * *

Wandering Wolf. During the Northeastern Weed Control Conference in New York City last month, we were pleased to notice the group's new president, Dr. G. D. Hill, being congratulated by Dale E. Wolf, president-elect of the Southern Weed Conference, brother organization to the NWCC. What was more interesting was the fact that both "weed leaders" are from the E. I. duPont de Nemours Co. Dr. Hill is at the duPont Experiment Station as head of research, and Dale is sales manager for the entire duPont line of biochemicals in the Industrial and Biochemicals Department.

USE...

AZAK*

Selective Pre-Emergence Herbicide



Azak, as indicated by center section, must be applied before crabgrass seeds are ready to germinate. Azak then penetrates seed at time of germination to prevent initial growth.

FOR CRABGRASS CONTROL

AZAK* is Hercules' new crabgrass control designed for pre-emergence application on established turf. Its effectiveness has been proved in commercial use. Available as an 80% wetttable powder, Azak 80-WP, it can be sprayed in conventional equipment or formulated by manufacturers into a granular product.

Azak brings to users the combined advantages of effectiveness . . . persistence . . . safety to established turf . . . low toxicity . . . economy . . . and practically no odor. Azak is

nonleaching. One application of Azak lasts through the crabgrass germination period. Of special interest to the manufacturer is its compatibility with most fertilizers and pesticides, and its low cost.

Technical information on and availability of Azak pre-emergence herbicide can be obtained from the nearest district office listed below, or from Agricultural Chemicals, Synthetics Department, Hercules Powder Company, Wilmington, Delaware 19899.

*HERCULES TRADEMARK



HERCULES

SZ65-3

BOSTON, MASSACHUSETTS / BROWNSVILLE, TEXAS / CHICAGO (OAK BROOK), ILLINOIS / DALLAS, TEXAS / FRESNO, CALIFORNIA / GREENVILLE, MISSISSIPPI / LOUISIANA, MISSOURI/MONTGOMERY, ALABAMA/PHOENIX, ARIZONA/RALEIGH, NORTH CAROLINA/SAN FRANCISCO, CALIFORNIA/VANCOUVER, WASHINGTON



This healthy plot of turf was treated with "Tupersan" at seeding. Note that the area outside the plot, which was seeded but untreated, shows crabgrass browned by frost.

Introducing Du Pont Tupersan™

WEED KILLER

A unique crabgrass killer which permits seeding and treating the same day (COOL SEASON GRASSES)

Du Pont "Tupersan" is a new pre-emergence weed killer which gives highly effective control of crabgrass and certain other annual weed grasses in turf.

"Tupersan" is highly selective. This new crabgrass killer can be used on newly seeded areas as well as on established turf without causing injury to germinating seeds of cool season grasses, such as bentgrass, bluegrass and fescue.

"Tupersan" offers a high degree of safety to turf. Rates as high as 100 lbs. per acre have not injured established turf; rates as high as 27 lbs. per

acre haven't injured new seedings or reduced seed germination. And new "Tupersan" has been used at high rates under many trees and shrubs without injury to them.

For full information on new Du Pont "Tupersan," consult your golf course supplier—your service agency.

On all chemicals, follow labeling instructions and warnings carefully.



Better Things for Better Living...through Chemistry