

Right Chemical
For Lawn Weed
Control 12

Solve Tree
Production
Problems 16

Turf Management
Training No. 2 24

WEEDS

TREES

and TURF

A TRADE MAGAZINES PUBLICATION

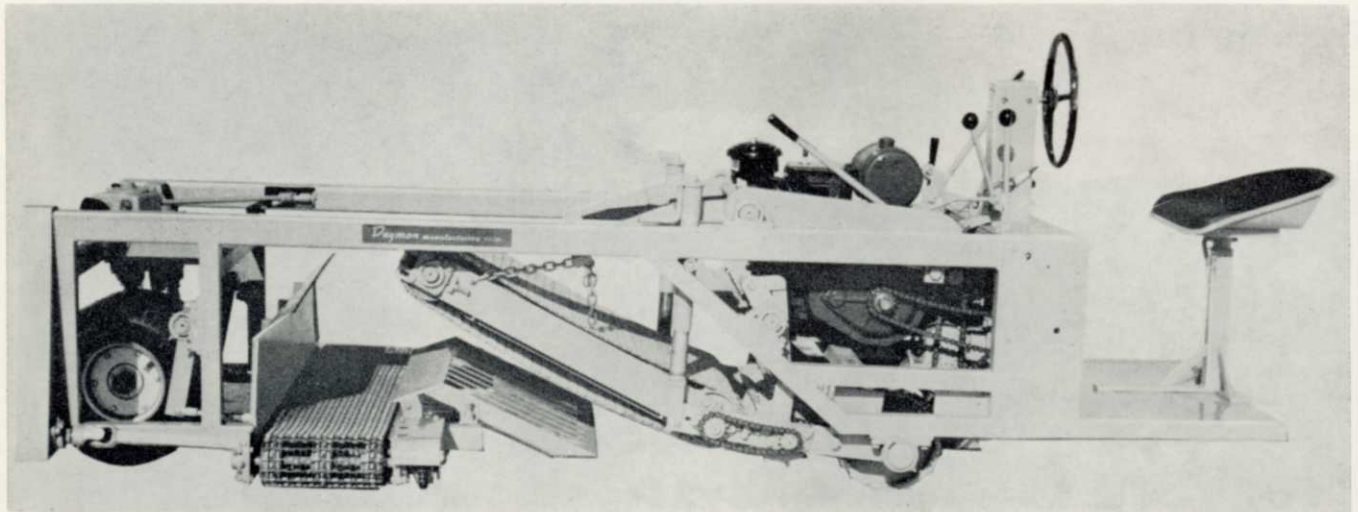
April 1967



New Hypo-Hatchet by The Ansul Co., Marinette, Wis., has proved effective in controlling undesirable trees in tests by Oregon State University School of Forestry (see page 16).

Monthly magazine of methods, chemicals and
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For more complete information and photo identification, see the back of this page.



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Daconil 2787

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For complete information on Daconil 2787 fungicide, contact your Diamond distributor. Or, ask for the booklet "Daconil 2787: the **ONE** fungicide" — it's available free from Diamond Alkali Company, 300 Union Commerce Building, Cleveland, Ohio 44115. (Indicate your interest — turf or ornamentals.)



Diamond Chemicals



Photo Identification:

TOP ROW LEFT TO RIGHT

Dollar spot attacking creeping bent. H. A. Runnels, PhD., Bot. & Plt. Path., OARDC.

Grey leaf spot on St. Augustinegrass. Note concentric lesions. T. E. Freeman, PhD., University of Florida.

Brown patch on creeping bent. Major problem on U. S. courses. M. P. Britton, PhD.

Leaf spot and crown rot damage on Kentucky bluegrass. M. C. Shurtleff, PhD., University of Illinois.

BOTTOM ROW LEFT TO RIGHT

Melting out on St. Augustinegrass. Healthy runner at left. H. E. Smith, PhD., A. P. S. Ext. Comm.

Early stages melting out on bent green. F. L. Howard, PhD., University of Rhode Island.

Active dollar spot on bluegrass. W. H. Daniel, PhD., Purdue University.

Brown patch on bentgrass. R. P. Freeborg, PhD., S.T.R.F.

(NOTE: Use of photos shown does not imply product endorsement by credited sources.)

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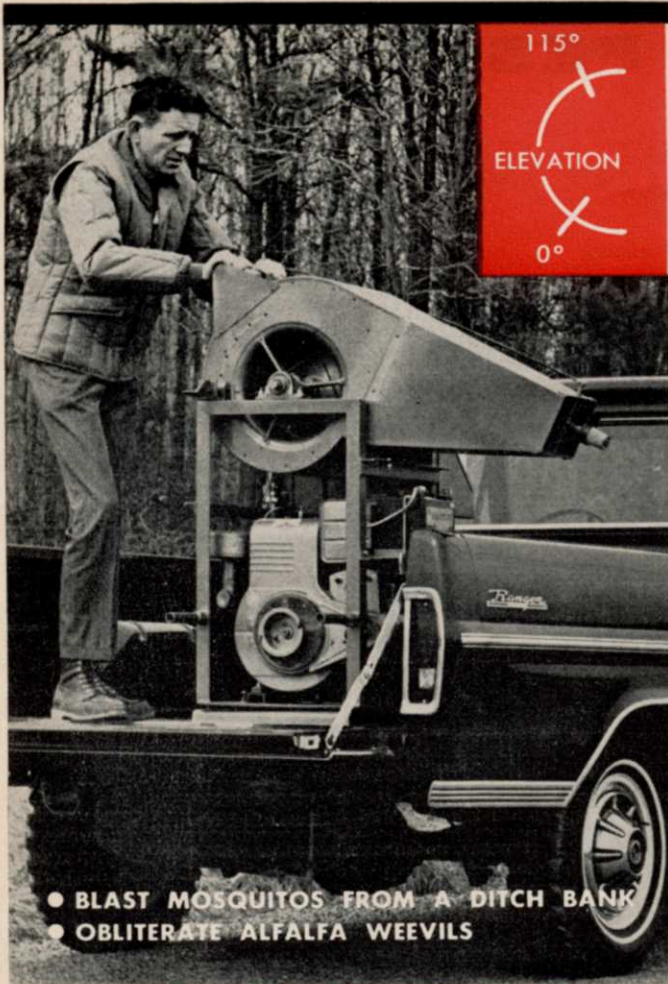
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WEEDS
TREES
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FORMERLY WEEDS AND TURF

April 1967
Volume 6, No. 4

Features:

Use the Right Chemical Tool For Weed Control In Lawns
By Dr. S. W. Bingham and Dr. C. L. Foy.....12

Solve Tree Production Problems
By Dr. Michael Newton.....16

Survey '67: Turfgrass Management Training, Part II.....24

Need For Variety of New Turfgrasses Stressed
At Michigan's 37th Annual Conference.....28

Across-Board-Tree Culture At
22nd Midwest Shade Tree Conference.....33

Santa Ana—A New Vegetatively Propagated
Turf Bermudagrass Developed For California
By Dr. Victor B. Youngner.....34

Departments:

Editorial: Let's Tell the Homeowner..... 6

Meeting Dates41

Insect Report42

Know Your Species: Cinquefoil.....44

Classifieds.....49

Advertisers Index49

Trimmings.....50

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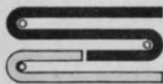
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Let's tell the Homeowner

We attended the 37th Annual Michigan Turf-grass Conference this month and saw lots to be impressed with. New research is exciting as always, and people in the industry are dedicated and businesslike in their approach to their problems. And the business is growing. People generally are spending more for sod. It's the status thing for the family moving into a new home.

And there are lots of landscape contractors on hand to serve the needs of this growing market. Generally, they are doing a good job as attested by the fact that a bigger percentage of the population is demanding the quality inherent in an "instant" lawn. More and more contractors in the business are learning the value of selling the customer the quality type of job which will serve him well and will be a credit to the industry. Proper grade, aeration, adequate fertilizer, and quality laying of freshly harvested sod will continue to help the market grow.

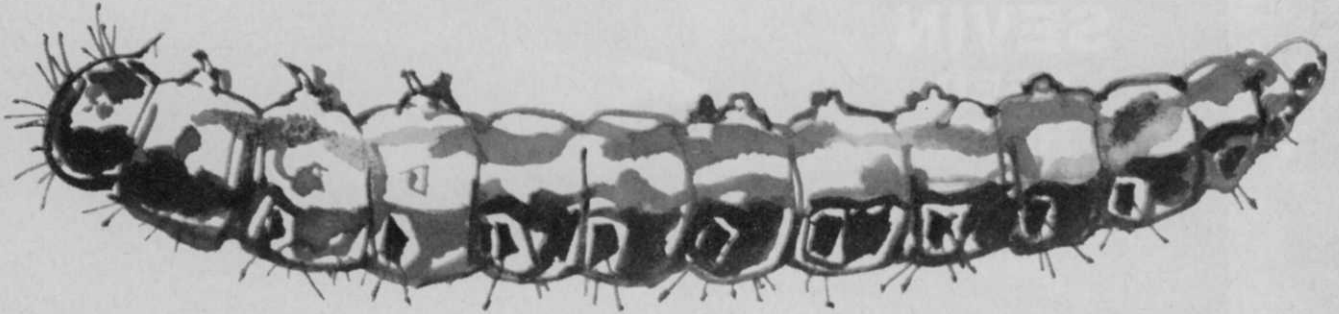
But it's at the point just beyond the sale that contractors could generally improve their service. They need to get together on recommendations for getting the new sod established and for maintaining it through the coming seasons. True, most tell the homeowner to water it heavily and to fertilize it well. But just telling the homeowner doesn't insure communication with him. Contractors need to write out the recommendations, along with any guarantee. County Extension Agent Donald D. Juchartz of the Detroit area put it best at the Michigan Conference when he said that contractors need to provide a garage sheet, something which can be posted and easily referred to. Include the watering recommendations for the new sod, or for the seeding when this is the case. Follow up with mowing instructions, fertilizer, weed control and pesticide recommendations, and most important of all, the times of the year when these should be done. Do the same for trees and shrubs. Naturally, no company can supply specific information such as this. Recommendations vary too much from community to community. But Extension Service county agents across the nation could help landscape contractors put together the vital points for their own specific areas. And the industry would be taking a further step toward guaranteeing customer satisfaction.

We suggest help can come from Extension Service county agents for this because they are closer to the needs of the community landscape contractor than anyone. They also have instant access to the latest research recommendations of the Land Grant College Experiment Stations in their own states.

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



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ROOT SAVER The Lo-Boy is used frequently with an aerator to punch holes in the clay and let the roots down. Other jobs include towing a 100-gallon sprayer, and broadcast of fertilizer. Triple 13 is applied every spring, then followed by two applications of nitrate of soda. Soil analysis has required liming for the past three years, too.



SURE FOOT Mowing areas total almost 200 acres and are trimmed on a twice weekly basis. Gang mowers mostly. "When the jobs get ahead of us, the gangs won't cut Bahia tops, though," Mr. Carpenter says. "Then we switch to a rotary which clips the tops instead of just pushing them down and rolling over."

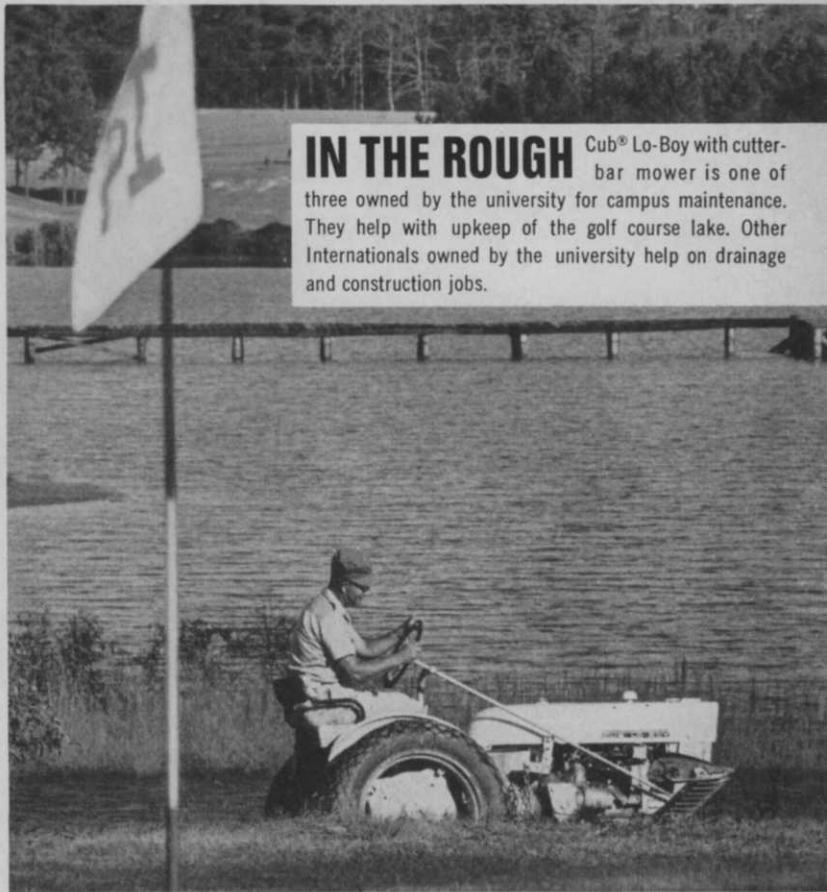
hard-pressed budget on university golf course

University of Southern Mississippi Golf Course at Hattiesburg was built in 1959 atop 250 acres of red clay and clay-gravel. It's a challenging course with steep hills and deceptive valleys, plus a 25-acre lake to harass long drivers.

It's a challenging course from a maintenance standpoint, too. Topsoil was already washed away from the slopes when the course was built. Bahia "pasture grass" was first planted for cover and now hangs on stubbornly against over-seedings of Bermuda. For James Ray Carpenter, superintendent, it's a continuing battle against nature with aerators, fertilizers, lime—and limited manpower.

But an International® 2424 Lo-Boy is helping Mr. Carpenter and his people slowly get the upper hand. Outlook? Bright. "We're thinking of building another nine holes, bring it up to 27," says Mr. Carpenter. "We'll start it off with a rotary behind that 2424 doing the land clearing."

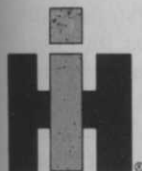
Your International Harvester dealer has the answer to your golf course problems, too. The best answer available. It figures, because he represents the most complete line of industrial tractors and flail, rotary and sickle bar mowers in the industry. Talk to him soon about a demonstration. International Harvester Company, Chicago 60611.



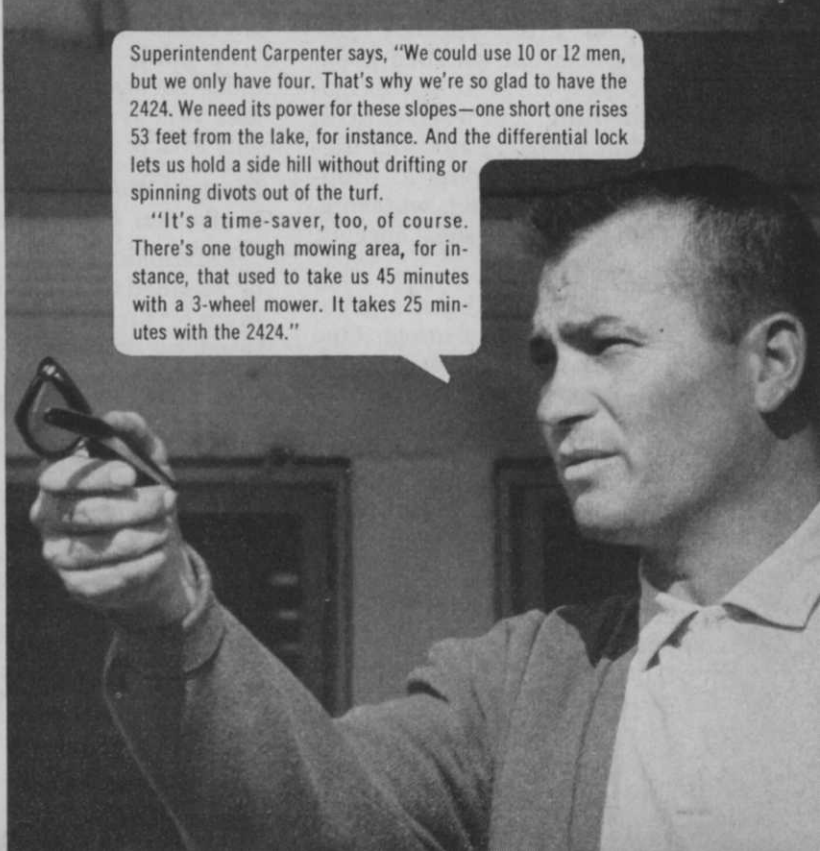
IN THE ROUGH Cub® Lo-Boy with cutter-bar mower is one of three owned by the university for campus maintenance. They help with upkeep of the golf course lake. Other Internationals owned by the university help on drainage and construction jobs.

Superintendent Carpenter says, "We could use 10 or 12 men, but we only have four. That's why we're so glad to have the 2424. We need its power for these slopes—one short one rises 53 feet from the lake, for instance. And the differential lock lets us hold a side hill without drifting or spinning divots out of the turf.

"It's a time-saver, too, of course. There's one tough mowing area, for instance, that used to take us 45 minutes with a 3-wheel mower. It takes 25 minutes with the 2424."



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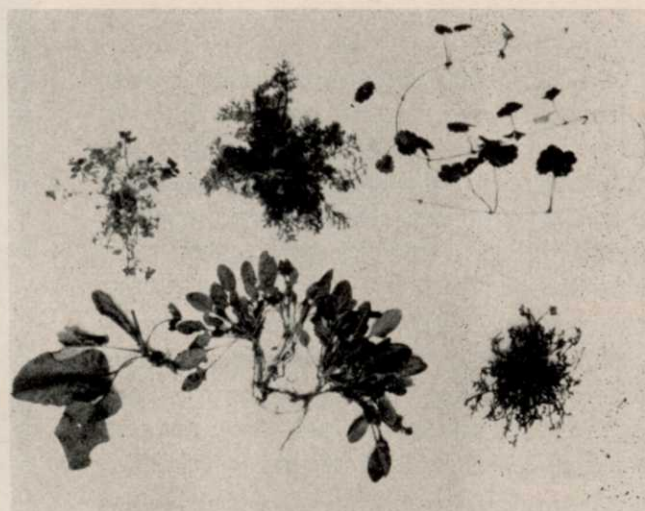


Use The Right Chemical Tool For Weed Control In Lawns

By S. W. BINGHAM and C. L. FOY
Virginia Polytechnic Institute, Blacksburg, Virginia



Representative broadleaved lawn weeds controlled with 2,4-D. Upper (left to right): broadleaf plantain, dandelion, spotted knapweed. Lower (left to right): buckhorn plantain, cress, chicory. Use either spot treatment or treat with wax bar.



Representative broadleaved lawn weeds not readily controlled by 2,4-D (requiring dicamba, silvex or other comparable product). Upper (left to right): common chickweed, yarrow, ground ivy. Lower (left to right): curly dock, red sorrel, prostrate knotweed.

GOOD LAWN and turf areas add beauty and protect soil from erosion. However, they don't just happen. They are carefully planned and maintained throughout the years. Selection of adapted grass species, preplant fertilization, seedbed preparation, proper seeding, irrigation, mulching, and weed control are initial steps. Later maintenance involves clipping at proper height, topdressing, watering, and control of diseases, insects, and weeds.

Weeds have long been a problem in lawn and turf areas. One of the best forms of weed control is proper grass establishment and maintenance. Improper management leads to weakening the stand of turf and to poor vigor; poor vigor and open stands lead to more weeds.

Only in recent years have good chemical weed controls been developed. There are still situations (such as scattered individual weeds in small home lawns)

when hand pulling or digging weeds remains the most effective method. In larger turf areas and with general or mixed weed infestations, however, control is now best achieved by use of chemical weedkillers.

A guide for selecting herbicides for weed control in lawns and turf is included along with this article for your files.

Preplant Weed Control Is Costly, But Often Justified

Establishment of new lawns or seedbeds, or rebuilding of old lawn or turf areas may be facilitated by preseeding treatments with soil fumigants. (See Table 1.) These chemicals (such as methyl bromide and SMDC) should be properly regarded as nonselective temporary soil sterilants that will kill all growing plants. Therefore, they should not be applied where they may contact roots of valuable plants.

These compounds kill weed seeds, rhizomes, and bulbs, and

then become decomposed in the soil, allowing planting of the lawn or turf area at a later date (usually a few days to a few weeks). Test plantings on a small area are advised before seeding the entire area to determine whether the herbicide has yet been dissipated to a nontoxic level, making it safe to plant the grass species. Time required for breakdown in the soil depends primarily on temperature and soil microbiological activity.

Preplant soil fumigation for weed control is usually quite a bit more expensive than recommended practices for established lawns and turf. However, the nature of certain weeds, particularly perennial grasses like bermudagrass, quackgrass, fescue, orchardgrass, and nutsedge—requires this approach since there are currently no satisfactory control measures to be recommended for established lawns.

The greater expense of soil fumigants and the objectionable waiting period before seeding

are therefore justified. Other beneficial results from soil fumigation include control of nematodes, fungus diseases, and insect pests. These also tend to offset and justify the initial cost of treatment.

Weed Control In New Turf

Chemical control of weeds usually is not advisable in newly planted lawns and turf. Chemicals act through the soil to some extent and affect the susceptible germinating seeds or young seedlings of most lawn and turf grasses. After the established grass has been clipped two or three times, it can safely be

tively simple with the wide array of new "chemical tools of the trade" now available, providing certain rules are observed

Before any chemicals are applied, grass should have reached a state of vigorous growth. This can be accomplished by good watering and fertilizing. Good vigor will insure rapid coverage by established grasses after weeds are killed or suppressed.

Plants are readily classified into two large groups, grasses and broad-leaved species. This classification is helpful, but it is not enough to make a good herbicide selection. For instance, crabgrass is an annual plant that re-

species are present, consult local extension service personnel, commercial representatives, or appropriate literature for positive weed identification before adopting a particular chemical weed control practice.

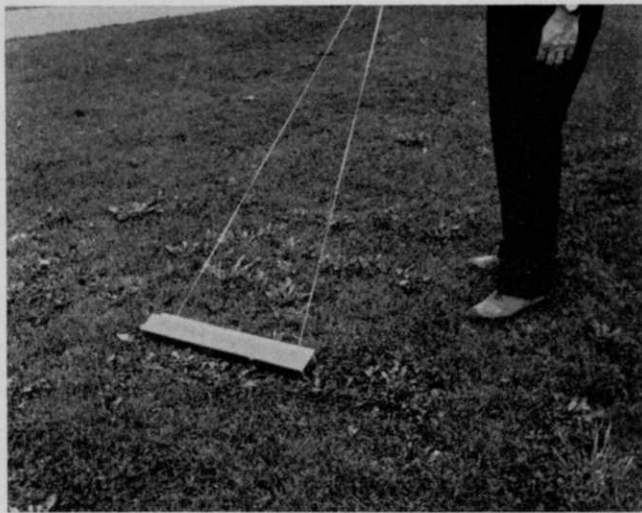
Herbicides Must Be Carefully Selected

Since we are dealing with "selective" herbicides in lawn and turf weed control, it is necessary to understand something of the nature of chemical compounds involved and the principles of herbicidal selectivity.

A given compound may be toxic or nontoxic to a particular



Spot treatment in lawn using plastic detergent jar.



Treating broadleaved weeds in lawn with wax bar 2,4-D.

treated. Many common field weeds in young lawns can be controlled by the competition of vigorously growing grasses and by subsequent mowing.

Grass Should Be Vigorous Before Chemicals Are Used

Control of most broad-leaved weeds and annual grasses in established lawns and turf is rela-

produces by seed and is readily controlled with appropriate herbicides before it emerges from the soil. On the other hand, bermudagrass is a perennial species that reproduces by vegetative means as well as by seed and requires an herbicide that will control a large, growing, more mature plant.

If in doubt about what weed

plant population, a single plant, a plant part, or individual cells, depending upon several conditions. Thus herbicidal selectivity is relative, not absolute—a good point to keep in mind.

A *selective herbicide* may be defined as one which, under specified conditions of use, is more toxic to one species of plant (the weed) than to another (in this instance, the lawn or turf grass). Some selective herbicides, such as bensulide, DCPA, and dichlobenil, work best through the soil; whereas others, 2,4-D, dalapon, and amitrole, for example, are most effective when applied to foliage. With still others, dicamba for example, activity through both root and foliar uptake is apparently important.

Among materials applied to

Table 1. Preplant Chemicals Guide

Herbicide*	Rate: lb/1000 sq. ft.	Remarks
Methyl bromide	10 lb.	Prepare area for seeding and use airtight cover. Expose soil to chemical for at least 24 hrs. and aerate for 24 hrs. Temperature must be above 55°F.
SMDC	10 qt. 5 qt. (with good tarp or airtight cover)	Drench chemical into soil using about 100 gals. of water. Use lower rate if cover can be installed immediately after application of SMDC.

*Caution: Do not breathe gases or allow skin to come in contact with these herbicides. Use only with extreme caution.

foliage, some may kill by contact (as DSMA and PMA), and others may be translocated to exert a toxic response in some other part of the plant (as 2,4-D, dicamba, and dalapon).

In practice, the responses of two dissimilar intact plants to herbicides may not be clearly related to any one selective mechanism, such as differential wetting. The principal factors known or believed to contribute to herbicidal selectivity are outlined below. These processes are not considered to be mutually exclusive, however. The choice of herbicides for a certain weed situation is often determined by several factors:

Principles Influencing Selective Use of Herbicides

Avoidance of contact between desirable plants or sensitive plant parts and toxic amounts of herbicide:

1. Directed or shielded spraying (as herbicides used along sidewalks, borders, etc.).
2. Placement of preemergence chemicals relative to position of grass and weed seeds, or roots of established plants.
3. Postemergence use of pellets or granules.
4. Delaying planting of grass crop until preplant herbicides (soil fumigants) are dissipated.

Morphological differences (observable features) that primarily influence retention, penetration, and translocation of herbicides to site(s) of action. Retention refers to the amount of herbicide still held by the plant after treatment.

Penetration, broadly defined, is the passage of substances into the plant leaves, roots, etc., and their entry into the various tissues, including vascular elements. Translocation, defined here, refers to long distance transport within the plant, presumably in association with vascular tissues.

1. Location of growing points.
2. Differences in growth habit (root systems, dormancy, aquatic as opposed to land plants, etc.).
3. Arrangement and angle of leaves.
4. Differential wetting due to waxiness, pubescence, corrugations, etc.
5. Nature of cuticle (except in roots).
6. Number, distribution, and degree of opening of stomata, insect punctures, and other perforations.
7. Differential interactions among plant surfaces, herbicides, carriers, and additives (such as surfactants, co-solvents, etc.)
8. Differential restriction of herbicide movement while enroute, as a result of absorption, ac-

Weed ¹	Herbicide ²	Rate of Application For Small Areas ³ Tbsp. per 1000 sq. ft.	Preferred Time of Application
Barnyardgrass	See crabgrass		
Bermudagrass	dalapon	10 tbsp. to 1 gal. of water	Spot treat when grasses are actively growing. Wet foliage thoroughly and repeat at 7 to 10-day intervals.
Bindweed	2,4-D	2-2/3	May & June
Bittercress	2,4-D	1-1/3	Oct. & Nov.
Black medic	dicamba or silvex	2/3 2-2/3	April & May
Buttercup	2,4-D	2	Oct. & Nov.
Catsear (false dandelion)	2,4-D	2	Oct. & Nov.
Chickweed common mouseear	dicamba ⁴ or silvex	2/3 2	Oct. & Nov. Oct. & Nov.
Chicory	2,4-D	1-1/3	Oct. & Nov.
Clover, hop	silvex	2	April & May
Clover, white	dicamba ⁴ or MCP ⁴ or silvex	2/3 5 1-1/3	Oct. & Nov. Oct. & Nov. Oct. & Nov.
Crabgrass Pre-emergence	Bandane or bensulide or DCPA (Dacthal) or DMPA (Zytron) or siduron (Tupersan)	9.2 lbs. of 7.5% gran. 5 lbs. of 7% gran. 1/4 lb. (Active ingredient) 1/3 lb. (Active ingredient) 4.4 lbs. to 8.8 lbs. of 2.34% granules	March Nov. to April 1. Late winter to early spring. Nov. to April 1. March
Crabgrass Post-emergence	CMA (Calcium acid methanearsonate)* or DSMA (Disodium acid methanearsonate)* or MAMA (Monoammonium methanearsonate)* or PMA (Phenyl mercuric acetate)* or MAA (Methanearsonic acid)*	16-32 tbsp. (10%) 1 1/2-3 oz. (70%) 2 3/4-4 1/2 oz. (20%) 2-4 tbsp. (10%)	When crabgrass is less than 1" height, repeat at 7-10 day intervals. Avoid treating during hot weather (above 90° F)
Carolina geranium (cranesbill)	2,4-D	10-20 tbsp. (16%) 2	June Oct. & Nov.
Dallisgrass	DSMA* (see crabgrass post-emergence)		
Dandelion	2,4-D	2	Oct. & Nov.
Dock curly broadleaf	dicamba	2/3	Feb. to April
Foxtail	see crabgrass		
Goosegrass	see crabgrass		
Ground ivy	dicamba	1	April & May
Hawkweed	2,4-D or dicamba	2-2/3 2/3	Aug. & Sept. Aug. & Sept.
Kentucky 31 fescue	see Bermudagrass		
Knapweed, spotted	2,4-D or silvex	2-2/3 2	Oct. & Nov. Oct. & Nov.
Knawel	dicamba or silvex	1/2 2	Oct. & Nov. Oct. & Nov.

cumulation, chemical complexing, phase distribution effects, etc.

9. Differential loss of translocated herbicides by leakage.

Biophysical-biochemical differences at the cellular level (inherent in constitution of the species and presumably involving enzyme systems).

1. Differential inactivation among species by absorption of herbicides.
2. Cytoplasmic membrane differences among species (sensitivity of membranes).
3. Interference with normal enzymatic processes in some species and not in others.

Weed ¹	Herbicide ²	Rate of Application For Small Areas ³ Tbsp. per 1000 sq. ft.	Preferred Time of Application
Knotweed	dicamba	2/3	March to May
Lambsquarter	2,4-D	1-1/2	April & May
Lespedeza	silvex	2	April & May
Mosses	ammonium sulfate	10 lbs.	Apply when actively growing. Expect temporary control until poorly drained soil conditions are corrected.
Mugwort	dichlobenil	74 oz. of 2% granular	Late fall or early winter
Mustards	2,4-D	2	Oct. & Nov.
Nimblewill	DMPA (Zytron)	1 pt. (3 lb./gal. A.E.)	June, repeat one month later. Wet actively growing foliage.
Nutsedge	2,4-D	2-2/3 tbsp.	When actively growing. Repeat each time new growth occurs.
Oxalis	silvex	2	April & May
Pennycress	2,4-D	2	Oct. & Nov.
Pepperweed	2,4-D	2	Oct. & Nov.
Pigweed	2,4-D	1-1/3	April & May
Plantain broadleaf buckhorn	2,4-D	2	Oct. & Nov.
Annual bluegrass	bensulide	5 lbs. (7%)	August & Sept.
Poison ivy or oak	amitrole or amitrole T	4 tbsp/gal. water 12 tbsp/gal. water	June Wet actively growing foliage.
Pony foot	2,4-D	2	Oct. & Nov.
Prostrate spurge	dicamba	2/3	April & May
Quackgrass	See Bermudagrass		
Red sorrel	dicamba	2/3	Oct. & Nov. or April & May
Shepherdspurse	2,4-D	1-1/3	Oct. & Nov.
Speedwell	silvex	2	April
Wild carrot	2,4-D	2-2/3	Oct. & Nov.
Wild garlic	2,4-D (wax bar or LVE)		Fall and Spring Drag wax bar over wild garlic shoots and repeat at 6-month intervals.
Wild strawberry	dicamba	1	Oct. & Nov.
Yarrow	dicamba	1	Oct. & Nov.
Black medic, chickweed, henbit, or white clover with 2,4-D susceptible weeds	dicamba plus 2,4-D or silvex plus 2,4-D	1/3 + 1-1/3 2/3 + 1-1/3	Oct. & Nov. Oct. & Nov.
Knotweed, red sorrel, or dock with 2,4-D susceptible weeds	dicamba plus 2,4-D	2/3 + 1-1/3	Oct. & Nov.

†Ed. Note: Guidelines offered here pertain, of course, most directly to Virginia conditions. Applicators around the country, however, will find helpful suggestions among the author's recommendations.

¹For mixed weed populations, mixtures of herbicides are suggested at the end of this list.

²Caution: Chemicals or pesticides followed by this designation (*) are extremely poisonous. Read the container label and heed warnings. In case of sickness while or after using, call your physician immediately.

³All rates of application for small areas based on 4 lbs. per gal. acid equivalent for 2,4-D, silvex, and dicamba and 2½ lbs. per gal. acid equivalent for MCPP.

⁴MCPP and reduced rates (not more than 1/3 lb. per acre) of dicamba may be used on bentgrasses for white clover and chickweed.

Author's Note: Trade and brand names are used only for the purpose of information and the Virginia Agricultural Experiment Station does not guarantee nor warrant the standard of the product, nor does it imply approval of the product to the exclusion of others which may also be suitable.

4. Differential rates of metabolic degradation or detoxification of the herbicide within the plants.

5. Differential rates of metabolic activation or toxification of an herbicide within plant tissues.

Finally, fluctuations in en-

vironmental factors such as temperature, relative humidity, light, and nutritional status are known to influence the response of plants to herbicides. Conceivably, such changes could also in-

duce differential responses among species.

Although not discussed specifically for each recommendation to follow, these factors do bear on practical herbicide use in lawns and turf, and the influence of such factors is reflected in the selection of herbicides shown in the guide at the end of this article. Two factors, stage of weed growth and influence of environment, deserve additional comment in relation to lawn and turf weed control.

Stage of Weed Growth Influences Control

Small weeds respond more effectively to chemical treatments than tougher, more mature plants. Germinating seeds or very young seedlings are most sensitive. Early treatment is particularly important in the case of grassy weeds, even though postemergence herbicides are also available. Where previous crabgrass problems have existed, preemergence herbicides give control without turf discoloration that is characteristic of all available postemergence forms.

With most broad-leaved weeds, a postemergence treatment is used. Chemical treatments are suggested during periods of active vegetative growth. When a plant slows down or stops vegetative growth, because of flowering or because of adverse environmental conditions such as dry weather, control is usually more difficult. Fall-germinating plants that spread by seed and establish rosettes before winter are best treated in October and November. These plants reduce vegetative growth in spring and begin to flower. They are more easily controlled in the rosette stage, and the lawn or turf area is maintained with a better appearance over longer periods of time.

Peak periods of weed seed germination occur in fall and spring. Then, herbicides are applied just prior to emergence (preemergence herbicides) or soon after seedlings begin to develop foliar treatments).

(Continued on page 23)

Solve Tree Production Problems

By

MICHAEL NEWTON

Assistant Professor
Oregon State University, Corvallis

COMMERCIAL growers are producing trees today in a wider variety of species, and for more purposes, than ever before. Whether for Christmas trees, ornamentals, or timber, all growers are faced with producing good quality trees at reasonable cost. Mortality, insect damage, slow growth, and many other problems contribute to costs of growing trees or add to the risk factor that must be considered as a cost of doing business.

A great deal has been learned about the basic nature of some problems of tree culture in recent years, and chemicals have been used successfully to solve many of them. The purpose of this paper is to illustrate that many problems of tree production can be solved at low cost, and with little risk if they are analyzed correctly and the proper chemical prescription applied.

Growers' Problems Are Related to Environment

Most technical problems of tree growers are based on environment. Some factors are beyond our control; many are controllable today that were not a few years ago. Virtually all problems related to the action of biological organisms or activated by them can be treated with chemicals at a cost that will ultimately reduce the cost per salable tree, or per unit of sales.

Success depends sometimes on

control of an organism that is causing damage actively and sometimes on elimination of either flora or fauna that intensify the action of climate and soil. Inasmuch as the agent causing problems may be microscopic or otherwise obscured, selection of the proper chemical treatment requires very careful diagnosis of the problem.

Weed, Fungus Losses Heavy in Nurseries

Weeds and fungi cause heavy losses in nursery beds. Effects from weeds are easy to confuse with signs of some fungi. Watering regimes are generally adequate in nursery beds to prevent

excessive mortality from weed-caused drought, but growth and general condition of seedlings is influenced markedly by heavy competition.

The first few weeks after emergence is the period when much mortality occurs, and the stage of growth in which seedlings are weak and succulent is prolonged substantially by weed competition. It is during this period that damping-off fungi take their toll.

Application of fungicides may cause temporary reduction of activity of harmful fungi. But, failure to provide good control of weeds can prolong the sensitive period until harmful fungi are once more active; hence a combined treatment for fungi and weeds may be justifiable. Recent work with herbicides for weed control in nurseries has indicated that some beneficial physiological response to the herbicide has been exhibited by conifer seedlings. There is evidence that some soil fumigants may produce the same response, together with their potential for control of weeds, fungi, and nematodes.

The likelihood of damage from the above biotic agents may be reduced with chemical treatments. Control measures will be required less frequently if other cultural techniques are applied that will promote growth of large, healthy stock — especially such techniques as applying fer-



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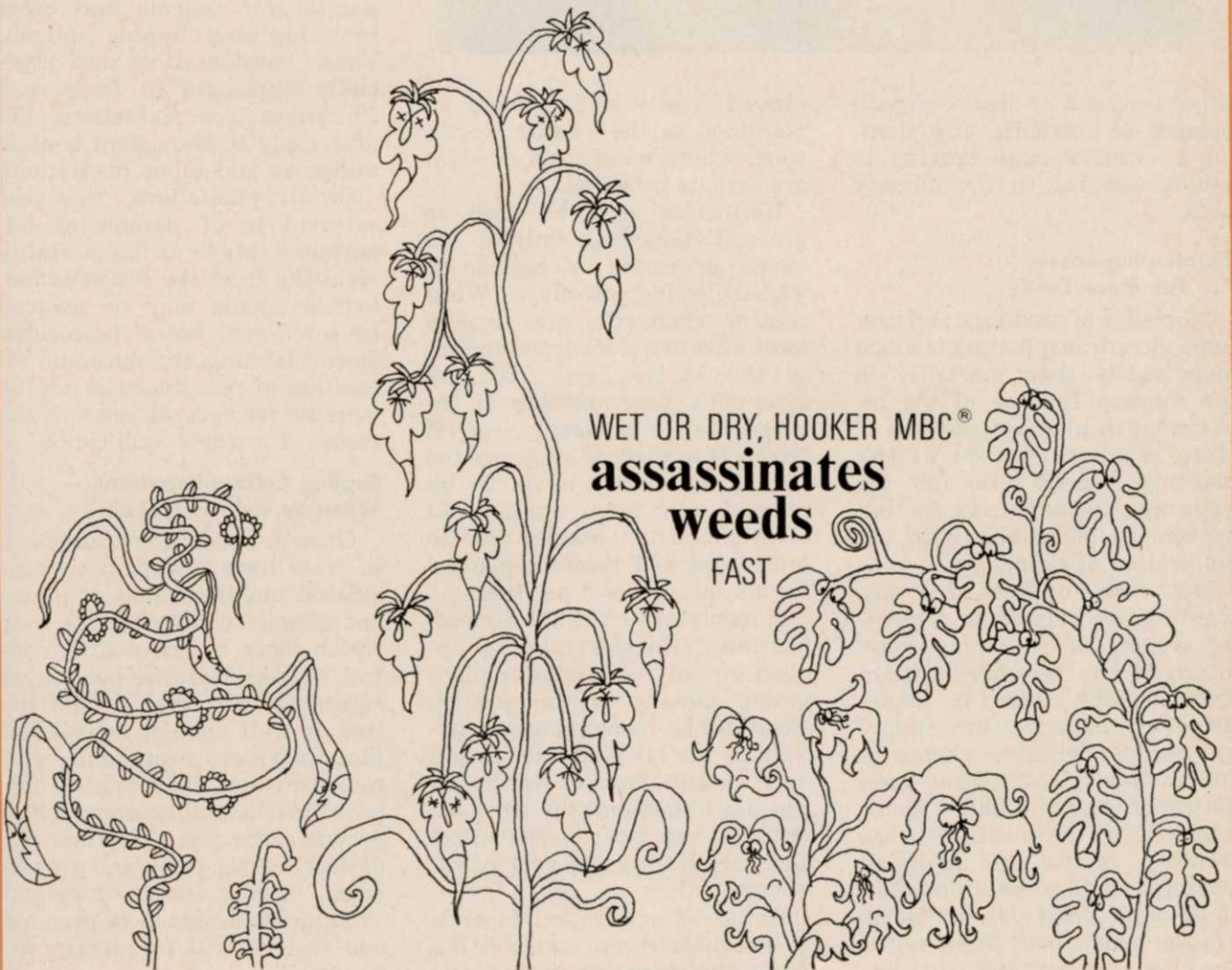
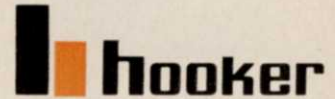
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Chemical thinning or cull tree control in saw-timber stands pays handsome dividends. Two examples of this can be seen at left in the last five growth rings after hardwood control in Douglas-fir forest.

tilizers needed to insure a good balance of nutrients, and planting at wide enough spacing to avoid crowding in the nursery beds.

Outplanting Losses Are Far More Costly

Mortality of seedlings and saplings after transplanting is much more costly than mortality in the nursery because of the investment in planting and loss of time in development of the planting. Herein also lies the greatest opportunity for improvement of results with the application of chemicals.

Most losses of trees after outplanting are related to competing vegetation in some way; much of the trouble is from drought alone, caused by depletion of available moisture supply by weeds. Selective chemicals and methods that permit good control of weeds in conifer plantings with no adverse effects are presently in use, and in many instances cause some stimulation of growth. Chemicals of the s-triazine group have been registered for this use, and have im-

proved vastly the success of plantings in the Pacific Northwest, where weeds and drought are serious problems.

Herbicides may be used to greatest advantage only if the whole operation is considered when selecting procedures. Weed control chemicals are usually most effective if incorporated into the surface soil. Toxicity symptoms may develop if incorporated too deeply, or if the roots of planted stock are too shallow. Heavy soils to be planted with large numbers of trees of resistant species may be pretreated and machine-planted for a minimum cost per tree.

If incorporation is not desired, triazine herbicides may be applied directly over conifer plantations already in the ground. Atrazine is recommended specifically for this use on heavy soils of the Pacific Northwest and has eliminated the need for virtually any other weed control measures during the year of establishment.

Method of application depends on available equipment and the size of the operation. Spot treat-

ments around individual trees are often recommended and have the advantage of ease of application for small-scale plantings. Band treatments provide weed control in the vicinity of individual trees or rows and may be applied with better control of dosage than is possible with spots.

Precision of application may be very important when degree of selectivity is marginal, as on some light soils where complete weed control is not needed. Where possible, broadcast treatment should be used to provide maximum benefits. Broadcast applications permit closest control of application rates, eliminate transpiration losses from peripheral weeds, and reduce habitat for rodents and other browsing and clipping animals. These considerations are especially important in forest and Christmas tree plantations, but also apply to transplant beds in nurseries and other plantations.

In all plantations, first-year survival is of paramount importance. Much of the mortality resulting from the action of biological agents may be avoided by intelligent use of herbicides. Good planning and optimum allocation of resources can accrue benefits for several years as the result of a single application.

Sapling Culture Important When Survival Is Probable

Growth habits, color, and form of trees have always been considered manifestations of inherent genetic characteristics over which there has been little control. These features become of substantial importance after the tree is well enough established that survival is probable, and measures may be sought to improve marketability, appearance, growth rate, etc. Fortunately, desirable form, color, and growth rates usually occur together. Treatments designed to promote one feature will frequently enhance all.

Under circumstances where growth is too rapid for proper form, and where such vigor is necessary to achieve desirable color, trees in good health often respond well to shearing or pruning. Measures taken to reduce growth without shearing frequently result in poor color and reduction of leaf size, and are not generally recommended where tree appearance is of value.

Treatments used to improve general vigor of trees usually involve reduction of competing weeds or brush. These may be combined with fertilization and watering. One of the most common applications of weed control in sapling plantations is in Christmas tree culture, where cultivation has been practiced in the past decade to promote growth and color of trees. More recent has been the adoption by some growers of complete weed control applications.

Atrazine for herbaceous weed control has been applied by aircraft over plantations up to harvest age to improve uniformity and color, and to enhance density of branching and budding. This practice has increased percentage of trees in high market grades, reduced culls, and reduced rotation length by one to

several years. Elimination of weed cover has reduced or eliminated need for fertilization for satisfactory Christmas tree growth on many plantations. Phenoxy herbicides may be applied before bursting of buds of conifers other than pines for selective brush control.

Young trees are often subjected to heavy damage from a wide variety of animals. Measures to protect trees are costly, and may cause mechanical injury nearly as severe as injury of some animals from which they are protected. Pure stands of tree seedlings or saplings are seldom complete habitats for animals that cause damage. Small rodents and rabbits depend on herb cover for protection and food; deer will seldom seek trees exclusively if other forage is available.

Complete weed control for two or more years reduces effective animal habitats temporarily without injuring the animals themselves, and at the same time provides for a vigorous spurt of growth that may well place trees out of reach of serious damage. Effects of these treatments may persist for the life of the plantation, because released trees seldom return to their former slow growth. Moreover,

trees developing in the uniform environment of a weedless culture are much more even in size and shape.

Chemical Tree Kill Offers Great Promise

Natural forest stands seldom have optimum composition of species and spacing of desirable trees. Until recently, alternatives in management have been limited to doing nothing toward stand regulation, or to doing it mechanically. Chemicals have been developed for tree injection that will kill almost any unwanted trees at low cost, permitting culture of uniformly desirable trees with little investment. If stands are treated in the large sapling stage, there will never be appreciable loss of growth in merchantable trees.

Application of this simple practice in forest management requires only a little professional direction, yet has the potential of bringing to maximum productivity almost any forest where the soil is occupied completely by trees. If this practice alone were applied to all the commercial forests of the United States where it was needed, it is likely that all projected demands for forest products in the foreseeable future could be met,

Trees planted in sod are subjected to severe competition for moisture and nutrients. Heavy cover harbors many rodents.



Mechanical scalping reduces competition briefly. Local cover attracts rabbits, deer and other animals that damage seedlings.



Selective control of trees in mixed stands favors desirable species only. Trees at left are badly suppressed, while released trees on right will need no further treatments.

with great improvement in quality at the same time.

Harvesting trees for sawtimber is an expensive business, and often contributes hazards to adjacent forests from fire and insects. Foresters soon will be seen in the woods marking timber with chemicals that will kill the tree to be harvested, protecting the drying timber from insects and fungal stains, and eliminating the accumulation of trash with dry leaves. Reduction of weight with increase in strength will permit loggers to fell timber with less breakage, and to ship logs at lower cost. As a conservation measure, this practice will permit the handling of marginal timber that has heretofore been left in the woods because of the cost of handling.

Insects and Fungi Are Constant Tree Threats

Throughout the life of a tree or forest, insects and fungi represent constant threats, ready to



exploit any weakness or entry. Occasional insect outbreaks in

forests have been treated with broadcast applications of insecticides.

The use of insect sprays in forests and on shade trees has become a highly emotional issue, and the subject of much controversy. Actually, the treatments now used are often monitored closely, with the finding that most forms of life are little disturbed. Forest pest control operations eventually will include systemics in sensitive or high-hazard areas.

Systemics may be introduced into trees by injection with no environmental contamination whatsoever, and the tailoring of formulation and season to the target insect will permit the restriction of most of the insecticide to the specific tissue on which the target insect is feeding. Some of these treatments



Decreasing rate of growth indicates heavy competition. Weed or brush control alone may greatly improve sapling vigor.



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straight years at the rates of 80 and 120 lbs. per acre. The Kentucky Bluegrass turf core at the left was taken from an adjoining plot that was not treated. Note that there is no difference between the treated and untreated cores. Similar results were obtained in plots of fescue and certain strains of bentgrass.

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will ultimately be suitable for insects that feed on phloem tissue, since these are inaccessible to broadcast spray treatments. Considering the importance of sapsucking and bark feeding insects on shade trees and in forests, systemics almost certainly will be used widely as soon as the technological picture is complete.

Chemical Management From Seed to Maturity

To summarize the picture, it is obvious from the few examples cited that a great many problems of tree culture may be solved with chemicals. Nurserymen, foresters, and shade tree specialists have, until now, been growing trees partly or entirely by hand or machine. The discoveries of the past few years have made many hand methods archaic because of their cost and the quality of results.

Safe, effective herbicides are now in use in many nurseries, bringing great savings in weeding labor. Fumigants have been used to solve nursery soil problems that had all but eliminated production of high-quality trees. Site preparation and sustained weed control in outplanting areas have improved survival immensely and have contributed to uniformly vigorous growth and fine appearance of saplings at considerable savings in cost per unit of growth or return. The excellent condition of trees grown under sustained weed control renders them much more resistant to disease and insects, reduces opportunities for animal damage, and lessens the risk that has been such a factor in production of trees.

Cost of removing undesirable trees has dropped to a few cents per tree, or less, for chemicals, and equipment is available that permits application to large numbers of trees at minimum labor cost and with negligible toxic hazard. The same equipment is useful for systemic insecticides, permitting low-cost control of insects that have been previously inaccessible.

There has been, without question, a chemical revolution in the woods. There are few prob-

lems of a biological nature that cannot be solved more economically, and in many cases more safely, with chemicals than with existing nonchemical methods. Opportunities for application of this technology are almost limitless, and the values enormous. Jobs will be created, rather than lost, because many jobs can now be done economically that have been left undone in the past.

Chemical industries can and should enter into research and development with an understanding of the objectives of tree growers. Once the liaison is established, the industries can do for tree growers as much or more than has been done in agriculture. On this scale, cooperation (or perhaps it should be called symbiosis) will make the growing of trees a far more attractive enterprise than has ever before been possible.

Use Right Chemical Tool For Weed Control (from page 15)

Many herbicides require an actively growing plant to absorb and translocate the chemical to a remote site of action. Underground stems, or rhizomes, of certain plants cannot receive direct treatment with herbicides. Summers are usually dry and hot; winters usually wet and cold. Under these conditions, vegetative growth is reduced and the situation is not ideal for application of herbicides.

A high degree of selectivity in a herbicide may, in some situations, be a mixed blessing. Despite its remarkable potency against certain weeds and its favorable margin of safety in lawn grasses, a particular herbicide simply may not be effective against all weed species in a mixed infestation.

In such situations, a combination of two or more herbicides, applied either sequentially during the season or mixed for application, may be indicated. In areas infested with crabgrass and mixed broad-leaved weeds, for example, crabgrass may be best controlled with a preemergence herbicide, but early post-

(Continued on page 46)



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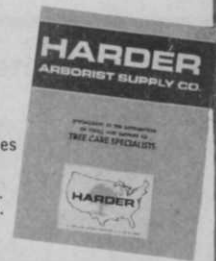
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Survey '67:

Turfgrass Management Training, Part 2

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

The Pennsylvania State University, University Park, Pennsylvania



Dr. J. M. Duich: Opportunities have never been greater but do co-exist under both a craft and professional philosophy. Future is attractive if both student and industry each plot a course.

Turf training at The Pennsylvania State University is the responsibility of the Agronomy Department, with Dr. J. M. Duich as Turfgrass Project Leader.

Programs offered include four-year undergraduate work leading to B.S. degree, graduate study towards M.S. and Ph.D. degrees, and a Winter Course (four 8-week terms over a two-year period). Studies leading to a B.S. degree, agronomy major with turf option) allow students to be practically oriented. Major areas of activity within the Agronomy Department are crops, soils, and turfgrass. Subject area of more academic graduate work is primarily dictated by students' area of research, which is being conducted in breeding, nutrition, soil physics, and weed control.

Begun in 1929 as a research program, Penn State offered its first undergraduate turf course in 1932, with formal recognition of a "turf major" for graduate and undergraduate study in 1949 and 1950, respectively. Currently, there are 13 undergraduates, with four M.S. candidates and two Ph.D. candidates. Winter Course has a current enrollment of 52 students working toward a Certificate in Turfgrass Management. Turf teaching is conducted by Dr.

Duich, Dr. D. V. Waddington, and A. T. Perkins, with Dr. H. Cole teaching turf pathology courses.

Requirement for entering B.S. program is a basic high school background plus college entrance exams. Grad students must have a favorable undergraduate average. Winter Course students are selected on basis of high school performance, experience, and recommendations by turf industry supervisors (practical turf experience is almost a necessity). Resident tuition for B.S. studies is \$130 per term; nonresidents pay \$260. Winter Course tuition per 8-week term is \$131.25 for residents and \$262.50 for nonresidents. Regular students enter the fall term, starting in mid-September; applications should be in by January or earlier. Winter Course starts mid-October; applications deadline is Aug. 1, or earlier for best consideration. Address inquiries to Pennsylvania State University, University Park, Pa. 16802, as follows: for Winter Course, Dr. F. C. Snyder, Director of Short Courses, Room 212 Armsby Building; for B.S. studies, Dean of Admissions; for graduate studies, Dean of Graduate School, 101 Willard Building.

Colorado State University, Fort Collins, Colorado



Dr. R. L. Foskett: Graduates are employed at world-renowned golf courses and turf operations.

Turf training at Colorado State University comes under the Department of Horticulture, and is directed by Dr. R. L. Foskett.

Programs offered include four-year undergraduate and graduate work, with a complete renovation of curricula now in progress. Studies will be designed to include specialized course work in soils, irrigation, plant pathology, plant physiology, and landscape horticulture. Turfgrass management students work towards B.S. or M.S. degrees in horticulture, with a turf option. On-the-job training, encouraged now, will soon be made a requirement of the program.

Begun in 1950, Colorado's program has a present enrollment of 10 turf students.

Turf instruction is conducted by W. G. Macksam, Jess L. Fults, and Jack Altman.

Requirement for entering the program is admission to the University, which calls for favorable class rank in high school and college entrance exams. Colorado residents pay tuition of \$112 per quarter, or \$336 per academic year. Nonresident tuition is \$337 per quarter, or \$1,011 per year. Admission is normally to the fall quarter, which starts on Sept. 17 in 1967. Prospective students, however, are encouraged to submit applications six months in advance of registration. Requests for additional information should be directed to Dr. R. L. Foskett, Head, Department of Horticulture, Colorado State University, Fort Collins, Colo. 80521.

University of California, Riverside, California

Turf training at the University of California, Riverside, comes under the Department of Agronomy, and is directed by Dr. Victor B. Youngner, Associate Professor of Agronomy.

Programs offered include four-year undergraduate, graduate, and evening courses conducted by the University Extension Service. Curricula in Riverside's School of Agriculture are currently being revised. "Students interested in turf management will take the Plant Science major (formerly Agricultural Science major), selecting electives which will be especially useful in this field of work," Youngner reports. "In addition, he must meet requirements in the Humanities, Social Sciences, Life Sciences, Physical Sciences, and Agriculture. While we have no vocational-type courses in the University of California, a conscientious

student can obtain excellent preparation for turf management as well as any agricultural occupation," Youngner says.

Begun in 1950 with graduate training only offered, undergraduate studies were added in 1958. Formerly at UCLA, this program was transferred to Riverside in 1965. Instructors in all fields important to understanding of turf management contribute to the program.

Requirement for entering this program is a high school "B" average or transfer in good standing after two years at a junior college. Currently, about the top 12% of high school graduates are being accepted. There is no tuition for California residents. Nonresident tuition is \$267 per quarter. Requests for information can be sent to Dr. V. B. Youngner, Department of Agronomy, University of California, Riverside, Calif. 92502.



Dr. Victor B. Youngner: Opportunities excellent for well-trained man with basic courses in plant sciences, fewer for short course graduates.

Kansas State University, Manhattan, Kansas



Dr. Ray A. Keen: Demand for graduates exceeds supply by factor of four or five.

Turf training at Kansas State University comes under the Department of Horticulture in the College of Agriculture, and is directed by Dr. Ray A. Keen, Professor of Horticulture.

Programs offered include four-year undergraduate and graduate work, plus a summer workshop course. Students work towards B.S., M.S., or Ph.D. degrees in agriculture. "There is no curriculum, as such, for turfgrass majors," according to Dr. Keen. "The curriculum is in the College of Agriculture, with majors in the various departments; turfgrass training is part of the ornamental horticulture section of the Department of Horticulture."

Begun in 1954, Kansas State's turf pro-

gram has a current enrollment of 17 students; there were four in the last graduating class. Turf management courses are taught by Dr. Keen, with supporting courses in the departments of Agronomy, Plant Pathology, Entomology, Botany, etc.

Requirement for entering the program is high school graduation. There is no tuition charge. Students are normally admitted to the fall session, which begins in September. KSU's next summer workshop in turf is tentatively scheduled for July 1968. Further information on the Kansas turfgrass management program can be obtained from Dr. Ray A. Keen, Professor of Horticulture, Kansas State University, Manhattan, Kans. 66502.

University of Massachusetts, Amherst, Massachusetts

Turf training at the University of Massachusetts comes under the Department of Plant and Soil Sciences, and is directed by Dr. Joseph Troll, Associate Professor of Turf Management.

Programs offered include two-year training, four-year undergraduate studies, graduate programs leading to M.S. and Ph.D. degrees, and an eight-week Winter School for Turf Managers. Two-year program is administered by the University of Massachusetts' Stockbridge School of Agriculture and leads to an Associate degree in Plant and Soil Sciences, major in turf management. This course is designed to qualify students for openings in the field. Four-year course leads to a B.S. in Plant and Soil Sciences with a turf option. Emphasis is on basic sciences which will prepare students for positions in research, teaching, industry, etc. Winter School offers a certificate upon completion; courses cover plant science, agricultural engineering, entomology, and landscape operations.

Begun in 1926 with the Winter School, described as the first course of its kind and the beginning of turf teaching in this country, Massachusetts added the four-year program in the early 1930's and the two-year program in 1946. Two year enrollment (which is limited by facilities) currently stands at 100. Winter School enrollment (also limited) is presently 30. Turf management courses are taught by Dr. Troll.

Requirement for entering these programs includes sound high school preparation and college entrance exams. Two- and four-year courses carry tuition of \$200 per year for residents, and \$600 for nonresidents. Winter School tuition is \$80, and this course will next convene in Jan. 1968, with Nov. 1, 1967, the application deadline. Regular students enter programs in September, with Mar. 1 the application deadline. Information requests can be directed to Dr. Joseph Troll, Department of Plant and Soil Sciences, University of Massachusetts, Amherst, Mass. 01002.



Dr. Joseph Troll: Opportunity is unlimited for graduates, especially for golf course and landscape work.

New Mexico University, University Park, New Mexico



Clarence E. Watson: Field has become a profession of its own.

Turf training at New Mexico State University comes under the Department of Agronomy in the College of Agriculture and Home Economics, and is directed by Clarence E. Watson, Associate Professor of Agronomy.

Program at NMSU is a four-year study course which leads to a B.S. in agronomy as part of the Recreational Areas Management curriculum. This curriculum is designed to train students as golf course superintendents, park and grounds supervisors, researchers in plant and soil sciences, educators, etc. Courses provide background in agronomy, horticulture, biology, agricultural engineering, mathematics, chemistry, and communications.

Begun in 1964, there are currently seven

majors in the Recreational Areas Management curriculum, with the first student due to graduate this spring. A graduate program is also being started.

Requirement for admission to the program is normally a high school diploma from an accredited school, though an acceptable ACT test score may be used in lieu of diploma. Tuition per semester is \$168 for New Mexico residents and \$393 for nonresidents. Next starting date for courses is Sept. 15, 1967. Application should be made several weeks in advance. Further details can be obtained from Mr. Clarence E. Watson, or from Dr. A. A. Baltensperger, Head, Department of Agronomy, New Mexico State University, Las Cruces, N. Mex. 88001.

The Ohio State University, Columbus, Ohio



Dr. Robert W. Miller: Many opportunities. Unable to supply needs of industry, private and public organizations, and others.

Turf training at The Ohio State University comes under the Department of Agronomy, and is directed by Dr. Robert W. Miller, Assistant Professor.

Programs offered include four-year undergraduate studies and advance work leading to M.S. and Ph.D. degrees. Degrees are in agronomy, specializing in turfgrass management. Students have a choice of programs in Agricultural Industries, Agriculture, or Agricultural Science. Intensive training in turf, soils, weed control, and other related agronomic fields, as well as in entomology, plant pathology, horticulture, and other sciences, is provided. Students must also complete work in such areas as English, humanities, social science, and communications. Dr. Miller says, of job training: "We have insisted that students in turfgrass management work on a golf course or some other turfgrass area. No college credit is earned, but the valuable experience is appreciated."

Begun in 1961, the Ohio program has a current enrollment of 17, and has produced 10 graduates with B.S. degrees and three with M.S. degrees. Courses in turf management are conducted by Dr. Miller, with other staff members.

Requirement for entering this program is high school graduation. Ohio residents pay \$150 per quarter for tuition; nonresidents pay an additional fee of \$186 per quarter. Students may enter at the start of any quarter. Undergrad applications are required by Aug. 1 for autumn quarter, Nov. 15 for winter quarter, Feb. 15 for spring quarter, and May 1 for summer quarter. Early applications are encouraged. Specific turf inquiries should be directed to Dr. Robert W. Miller, The Ohio State University, Department of Agronomy, 1827 Neil Ave., Columbus, Ohio 43210. General admissions information can be obtained from Admissions Office, The Ohio State University.

University of California, Riverside, California



Dr. John H. Madison: Best opportunities are in park administration and planning. Many not willing to pay for top calibre student.

Turf training at the University of California, Davis, comes under the Department of Landscape Horticulture, and is directed by Assistant Professor John H. Madison.

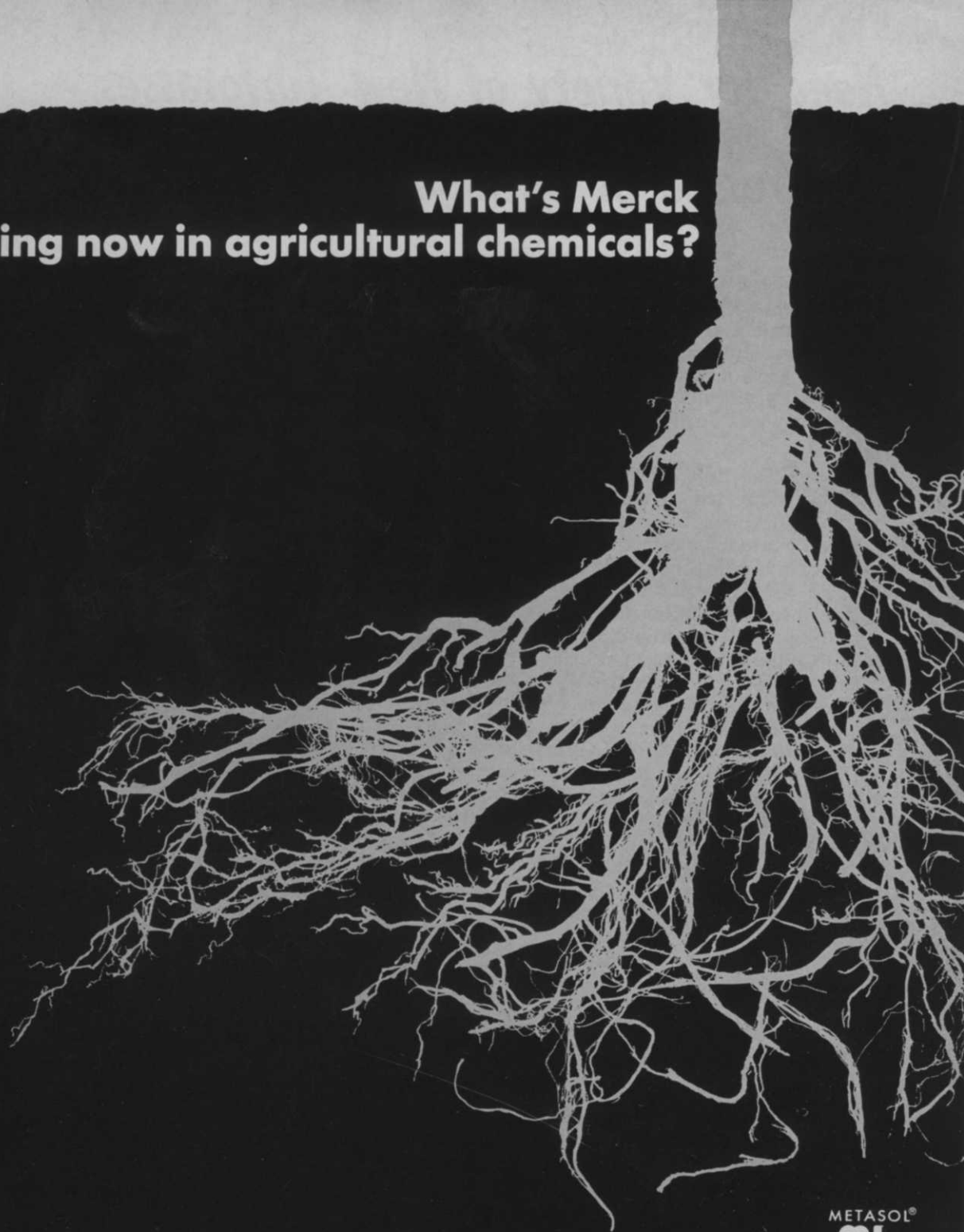
Programs offered include four-year undergraduate and graduate studies. Students may obtain a B.S. degree in plant science with a major in landscape horticulture, floriculture, or park administration; M.S. in horticulture; or Ph.D. in botany, plant physiology, soil science, or genetics. "Majors emphasize sound preparation in plant science," according to Madison. "In the senior year, a student's entire background is brought to focus intensively on problems of turf culture. This may be supplemented with summer work in the field. We expect all of our graduates to have a good background in turf, and sooner or later most of them use it. Students especially inter-

ested in turf can be given individual consideration—for example, by working on the turf research program."

Begun in 1953, the Davis program has a current undergraduate enrollment of 18, with 13 M.S. candidates and two Ph.D. candidates. Courses in turf culture are taught by Dr. Madison, with numerous staff members teaching allied subjects.

Requirement for entering this program is the equivalent to graduation in top 12% of accredited high school class. Nonresident tuition plus fees comes to \$348.50 per quarter, while California residents pay \$81.50 in fees. Starting date for '67 is Sept. 25, with application deadline past; '68 starting date is Sept. 23. Program inquiries should be directed to Chairman, Department of Landscape Horticulture, University of California, Davis, Calif. 95616.

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AGRI-STREP biocide for fruit blights

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Need for Variety of New Turfgrasses

Stressed at Michigan's 37th Annual Conference

Turf is the fastest growing agricultural crop in Michigan today. Some 174 growers handled 20,000 acres this past year. Evidence of growth is seen by comparing progress with 1960 when production was only about 5,000 acres.

Though the full 20,000 acres was not harvested in one year, gross cash returns to growers in 1966 amounted to \$27 million. These are data presented by the staff of Michigan State University to members of the industry attending the 37th Annual Turfgrass Conference March 15-16. Overall, returns to the industry last year were estimated to be \$222 million. Of this grand total, maintenance accounted for \$149 million with production, shipping and laying of sod adding up to \$72 million. Maintenance of home lawns is the major source of income to the industry, estimated to be a \$90 million operation in the state. Golf courses were next with expenditures of \$18.5 million, followed closely by industrial areas at \$18 million. The Michigan staff stresses that many of these figures are estimates, but careful study leads

them to believe they are conservative.

Even so, the industry for Michigan is a major one and one which is growing. This rapid rate of progress is demanding answers to many new problems, a situation to be expected. For example, sod producers need more and better equipment to take the place of almost nonexistent hand labor. No longer can the grower depend on seasonal help to harvest the crop. Growers are also concerned about the need for new varieties and mixtures which will stand up on the home lawn despite the varied management he is in the habit of practicing. Industry needs a variety of types of turf also, to meet the demand for quality and utility. And practically everyone in the industry is concerned with the threat of disease to existing varieties, especially to Merion bluegrass and especially in Michigan.

New Research Aimed Specifically For Sod Grower

Like a number of leading research institutions, Michigan State is pushing for answers. Dr. James B. Beard of the depart-



John King, researcher, MSU Crop Science Department, discussed rooting characteristics of organic and mineral-based sods.

ment of Crop Science at MSU discussed many of the practical phases of the industry about which much of the new research is centered. Flooding, a perennial problem in many areas, causes varying amounts of damage depending on the type of grass and temperatures. At 50° Fahrenheit, few varieties of grass are hurt. Bluegrass, for example, showed little or no damage for the first 30 days under water, some damage at 45 days. Bentgrass showed no damage during the first 40 days of exposure to flood-type conditions and no serious damage for 60 days. *Poa annua* (annual bluegrass) showed the first injury at 25 days, red fescue at 15 days.

But when temperatures are higher, all grasses suffer heavy damage. At 86° F. red fescue showed kill at one day, bluegrass after 3 days, others accordingly.

Optimum temperatures for growth of turfgrass are in the 65° to 70° range. Growth slows appreciably when temperatures climb to 86° and kill is evident at 105° to 108° and above in annual bluegrass. Dr. Beard said



Principals at Turf Conference: Dr. Paul Rieke, Department of Soil Science at MSU, left; President Frank Farier of Michigan Turfgrass Foundation, center; and Dr. James B. Beard, Department of Crop Science, MSU.

What is there to weed control besides just killing weeds?

Maybe the area to be treated is already weed-free. Or maybe it's infested with established weeds. Perhaps the weeds are annuals. Or deep-rooted perennials that ordinarily are more difficult to control.

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kill at such temperatures had proved to be a surprising phase of the research. In this particular study, air movement was found to be a major factor in cooling the growth area of turf. As little as 4 mph of air movement cooled the growing area by 14 F. at mid-afternoon.

Mulches continue to be tested for erosion control and their value in establishing a good microclimate for new grass establishment. Straw with asphalt tie-down still proves superior in Michigan studies. Some new types do give erosion control, but fail to deliver adequate establishment conditions. Excelsior material shows promise according to Dr. Beard.

Three primary factors attribute to winter kill. Besides desiccation, snow mold and low temperatures are prime problems. Snowfall on unfrozen ground sets up ideal conditions for snow mold. High temperatures followed by sudden drops below 20° F. create conditions for kill.

Oxygen suffocation from sheet ice cover is not a common problem. Research shows that there is little damage during the first 75 days and ice cover for this long a period is uncommon. Bentgrass showed no injury in the first 75 days of ice cover, and Kentucky bluegrass and annual bluegrass very little.

Fusarium Blight is Spreading To North Central Area

Fusarium blight, a relatively new disease problem in the east is spreading and has been found in Michigan. This fact is causing concern at the moment in this upper north central producing area of the nation.

Dr. Paul Rieke, department of Soil Science at MSU, brought the 500 turf industry members at the conference up to date on current fertilizer studies at the institution. Regarding use of urea nitrogen on turf, he reported that 1, 2 or 3 applications gave results superior to 6 applications yearly, providing that irrigation was sufficient.

And in establishing new turf from seed, all elements of fertilizer do as well with surface application as when placed 2 to



Turf panel fields questions from floor: Top, left to right, Pat Biondi, Melvindale-Northern Allen Park Schools; Herbert Taylor, Herbert Taylor and Son Landscape Contractors, Detroit; and Bill W. Milne, Superintendent, Grosse Pointe Country Club. Below, left to right, Arthur T. Durfee, General Motors Technical Center, Warren; James Smith, Huron-Clinton Metropolitan Authority, Milford; and David Heiss, Cascade Country Club, Grand Rapids.



4 inches deep except phosphorus. Phosphorus alone did a significantly better job when worked into the soil. He also reported more winter hardiness where the nutrient level is high—among all types of grasses except bentgrass.

John King, researcher in the MSU Crop Science department, discussed studies with organic and mineral-based sods. Sod grown on organic soil, he said, had a greater rooting capability than sod grown on mineral soil. Rooting proved to be much slower on a clay soil compared to a sandy loam.

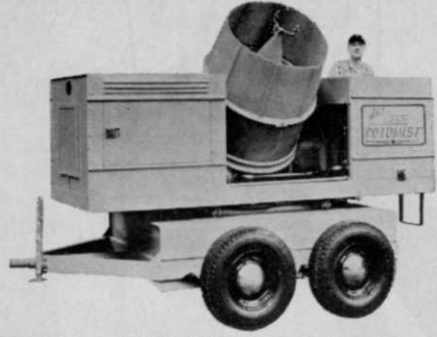
Watering properly may be more important in most cases than normally realized. Soaking

heavily when sod is first laid is considered the optimum practice. Afterward, best results are obtained by watering only 1/8 inch daily. This has proved superior to watering a full quarter inch daily.

Directors elected by the group were: James Standish, executive secretary, Michigan Golf Course Association, Detroit; James Smith, Field Landscape Architect, Huron-Clinton Metropolitan Authority, Milford; and Roy Peck, Superintendent Country Club Golf Course, Kalamazoo. President Frank Forier and Vice-President Bill W. Milne were re-elected to their respective positions.

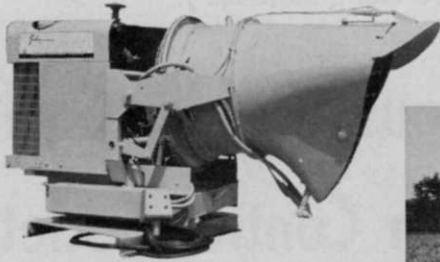


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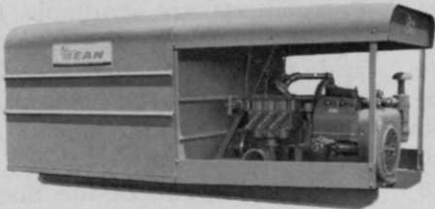
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Inspecting large fresh-water snails, which are being evaluated for biological control of various aquatic weeds, are officers and directors of The Hyacinth Control Society (left to right): President, Dan Gorman, Hillsborough; Vice-President, Zeb Grant, Central and Southern Florida Flood Control District; Secretary-Treasurer, Robert Blackburn, U.S. Department of Agriculture; Editor of Newsletter, Lyle Weldon, U.S. Department of Agriculture; and Directors, Jack Salmela of Brevard Mosquito Control District, Clayton L. Phillippy, Fishery Biologist of Florida Game and Fresh Water Fish Commission, and Paul Cohee of Hercules Incorporated.

Kill of All Noxious Weeds, Goal of The Hyacinth Control Society

Goal of The Hyacinth Control Society, Inc., at Fort Lauderdale, Fla., is to exchange information on aquatic weed problems at the applicator level. In restating the full scope of this goal, members believed the name chosen at birth of the organization in 1961 led many to believe that interest was limited to hyacinth control. Such is not the case. To make this clear, officers and directors have placed an addendum to the name which states, "The Hyacinth Control Society—Dedicated to the Control of Noxious Aquatic Weeds."

That the group is active in all phases and on all types of aquatic weed control is demonstrated in a listing of papers presented at the Society's meeting last year. Only one of 18 papers pertained directly to water hyacinth control. Others covered the entire spectrum of aquatic weed control.

Charter membership of the Society was 30. Current members number 150 and persons interested in information at a scientific level aimed at the application of specific findings are

being invited to join the group. Both active and associate memberships are available. Each type entitles the member to a copy of Proceedings of the annual meeting and to the quarterly newsletter of the group. The first five annual volumes of the Proceedings are available at a nominal cost. Application forms and other information are available from Secretary-Treasurer Robert D. Blackburn, P.O. Box 9087, Fort Lauderdale, Fla.

Chief program of the Society during the past year has been preparation and selling of an aquatic plant herbarium. Blackburn says the group has found that a primary problem of individuals or companies beginning aquatic weed control is proper identification of various species of aquatic weeds. The aquatic herbarium that is available includes 52 specimens which occur throughout the United States. These are sold at cost for \$2 per sheet. A complete listing is available from the Society.

Annual meeting of the group for 1967 will be June 18-21 at the Holiday Inn, Fort Myers, Fla.

Across-the-Board Tree Culture At 22nd Midwest Shade Tree Conference

Dutch Elm Disease continues to plague the industry, despite the best research and control efforts, but use of cobalt 60 and its effect on Dutch Elm Disease at the research level shows some promise. Dr. Richard Campana, president of the International Shade Tree Conference and plant pathologist at the University of Maine at Orono, is heading up this work at the Maine Experiment Station. At the recent Midwest Shade Tree Conference at Chicago, Dr. Campana reported that by the time a tree shows general symptoms of the disease, it very likely was infected during the previous season. In his research terminal inoculations developed very limited reactions the first season. High levels of radiation to cobalt 60 caused marked changes in plant growth. Dr. Campana said a general stunting and dwarfing effect was noted with some degree of control. Work on the project is to continue.

A Des Moines, Iowa, group, David Orcutt, Iowa Power and Light Co., Harold Hodgkinson, City Forester, and John L. Wright Jr., Wright Tree Service, discussed the big elm tree removal program brought about by a major epidemic of the disease. Both utility crews and private contractors are cooperating in a massive citywide effort to cut down outages and damage claims to public and private property. Some \$67,000 will be spent for tree replacement during the coming six years.

Safety Is Prime Factor In Working Near Powerlines

A slide training film presented by Arthur R. Truelsen, Safety Advisor, Commonwealth Edison Co., at Northbrook, Ill., emphasized safety factors when working around powerlines. Utility arborists must be able to recognize line power by learning size and type of insulators used for each. A body or tool clearance



Webster Crowley
Morton Arboretum

Ralph Carmichael
President

of 8 feet is mandatory on 320,000 volt lines on towers. This distance, according to Truelsen, includes using even pruners and saws. As size of transmission lines decreases, safe clearance drops as low as 3 feet. Without proper clearance, Truelsen warns against pruning unless such wires are "rubbered up," that is, insulated for personnel protection. He also urged proper grounding for bucket trucks along with daily inspection of hydraulic lines on both cranes and bucket trucks because they present a serious potential fire hazard. First aid training, especially mouth to mouth resuscitation, Truelsen believes, is most important for safe operation among line clearance crews.

Dr. Donald L. Schuder, Department of Entomology, Purdue Univ., Lafayette, Indiana, gave clues on spotting spruce mite damage which is often confused with other types of mite damage. Early season damage, he said, is usually from this mite. Lime-sulphur dormant sprays are effective as well as several well-known miticides such as kelthane.

In working with sod webworms and their control, Dr. Schuder reported the omni-directional light trap has proved that moth activity over lawns is not greatest in the evening and mornings, but that peak activity is between midnight and 2:00 a.m.

Basic interrelationships between design, construction and maintenance in development and utilization of the landscape were discussed by Justin C. Harper,



Noel B. Wysong, sec.-treas., left, confers with Orville Hatcher, pres.-elect.

Deere & Co., Moline, Ill. Harper believes the future of any landscape project lies almost wholly in the hands of the person who will be maintaining it.

Distinguished Service Award To Dr. J. Cedric Carter

A distinguished service award was presented Dr. J. Cedric Carter, Illinois Natural History Survey, Urbana, for meritorious service to the Midwest Chapter and the International Shade Tree Conference.

Officers elected at this 22nd Midwest Shade Tree Conference at Chicago, February 8-10, were: President Orville Hatcher, City Forester, Omaha, Neb.; Vice-President, Archibald E. Price, Glenview, Ill.; and re-elected as Secretary-Treasurer, was Noel B. Wysong, Golconda, Ill.

The 314 attending the event made plans for their 1968 chapter meeting to be held at St. Louis, Mo. Presiding at the opening of this 22nd convention, President Ralph G. Carmichael, Bettendorf, Iowa, urged the group to take an active part in the proceedings and to aid the cause of education and cooperation among arborists and others concerned with shade trees. Both Iowa State University Extension Service and the University of Illinois set up displays which included their latest bulletins and publications concerning the industry.

Santa Ana—A New Vegetatively Propagated Turf Bermudagrass Developed for California

By

VICTOR B. YOUNGNER

University of California, Riverside

Santa Ana, the first vegetatively propagated turf bermudagrass developed specifically for California was released in 1966 by the California Agricultural Experiment Station and distributed to stolon and sod producers for propagation.

This new variety had its beginning in 1956 as one of several hundred seedling selections made in a segregated population from a strain of South African origin (Plant Introduction number 213387). After several years of further selection among these clones, only a few remained. One of these was number RC-145, which formed a dense, smooth, dark green turf. Subsequently RC-145 was tested in many California locations under various conditions and almost always received top ratings. Last year it was named Santa Ana after the well-known California city to identify it as a variety from and for California.

Santa Ana Matched To California Needs

Bermudagrass varieties developed in the East and South are used extensively in California and have been valuable additions to our list of turf varieties. However, there has always been a need for varieties more nearly meeting the peculiar turf requirements of the Pacific Coast region. Santa Ana is our first attempt to achieve this objective.

Although Santa Ana has had wide testing in California, it has been in few trials outside the state. Therefore, its performance and value in other parts of the country are unknown. A thorough test of Santa Ana is recommended before it is produced or sold in these areas.



Greenhouse flats containing vegetatively propagated turf bermudagrasses are being checked, above, by Dr. Victor B. Youngner, in charge of this research at the University of California, Riverside. Laboratory performance is checked closely and followed by field tests.

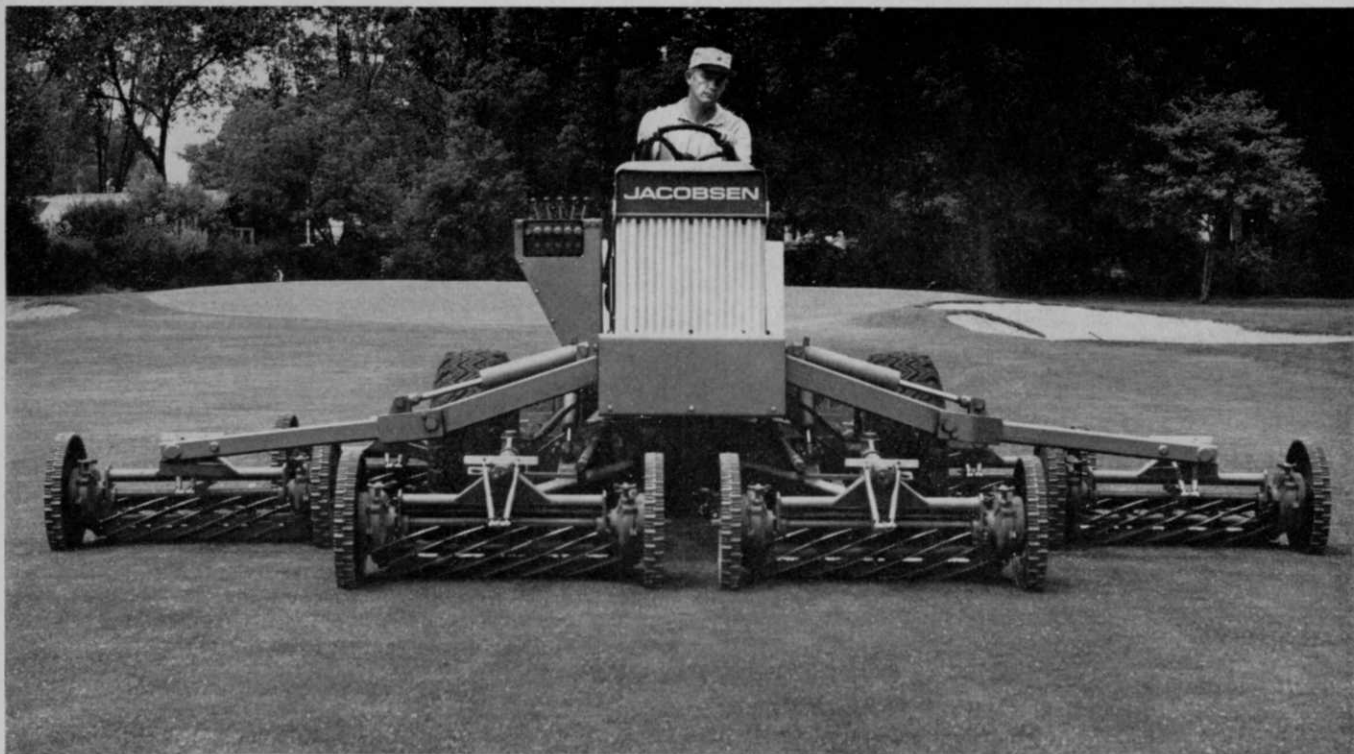
The smog tolerance exhibited by Santa Ana has excited considerable interest. While smog has long been thought of as a southern California problem it has now become a problem in many metropolitan areas. This characteristic of Santa Ana may, therefore, assume a wider importance in time. Typical injury from smog as seen on Tifway or Tifgreen is a bronze discoloration of the blade tips. Very little of this has been seen on Santa Ana, even after a day of severe smog conditions.

In California, where turf is used the year around, a short winter dormant period is highly desirable. Santa Ana is superior in this respect to Tifway and Ormond, previously our best strains for winter color. This characteristic may be undesirable in colder climates as prolonged growth in the fall and

early spring green-up may reduce its winter hardiness.

As with any bermuda variety, proper management is essential to obtain the shortest possible dormant period. Thatch must be controlled as no bermuda will remain green in cool weather if it has developed a thick thatch. Adequate, readily available nitrogen must be provided to stimulate new growth under the lowered temperatures. We have kept Santa Ana green throughout the entire winter in mild coastal areas by early fall thatch removal and biweekly applications of ammonium nitrate or ammonium sulfate. Heavy nitrogen fertilization in late fall is not recommended, of course, where winters are severe.

Other characteristics of Santa Ana bermuda include high salinity tolerance, a feature of great importance to turf management



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Young evaluation plots of salt tolerant selections of creeping bentgrass, above, are under study at the Department of Agronomy, University of California, Riverside. Santa Ana is one of varieties to be included in the California certification program for vegetatively propagated turfgrasses.

in arid climates, and resistance to the Eryophyid mite. This mite has recently become a serious pest of bermuda throughout the Southwest.

Vigor, Wear-Resistance Are Santa Ana Features

Although Santa Ana has a medium-fine texture it is vigorous and highly resistant to wear. It recovers rapidly from any injury such as divots. For these reasons it is especially recommended for golf tees, playgrounds, athletic fields and other heavy use turfs. Homeowners, on the other hand, may find it to be too vigorous for them to maintain easily.

Viable seeds are not normally produced under California conditions although flower heads may appear at times. Flowering, with the resulting steminess, may be kept low by maintaining adequate nitrogen fertility levels. In general, however, Santa Ana is one of the least stemmy of the bermudagrasses we have grown.

Fungus diseases of bermudagrasses have not been serious problems in California so Santa Ana has not been tested for disease tolerance.

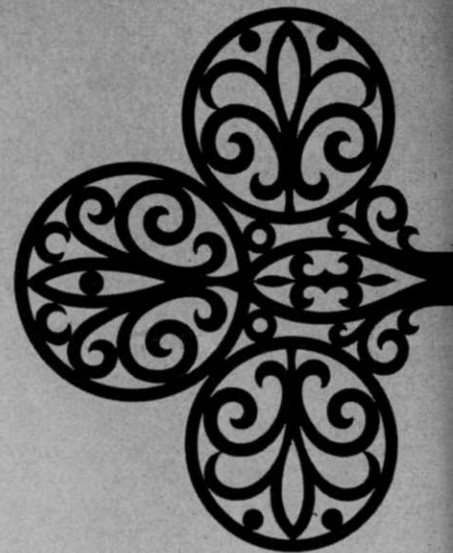
Stolon and sod producers will

not find it necessary to modify their regular growing practices for Santa Ana. Its rapid rate of establishment should give them a marketable product a short time from planting.

Santa Ana will be included in the California certification program for vegetatively propagated turfgrasses. California producers are urged to follow the certification regulations in growing this new variety. However, meeting the certification standards is not a requirement and any grower may obtain planting material upon request.

California stolon and sod producers who obtained propagating material in the summer of 1966 were: Jacobsen Brothers Turf Farms, Tehachapi; Cal-Turf, Camarillo; Dennis Turf-grass Company, North Hollywood; and Duro-Sod Farms, William H. Brown Nurseries, Inc., Alhambra.

Several more nurseries in California and other states have arranged for stolons for 1967 spring planting. Growers wishing to have it for production or testing may obtain small amounts of stolons from the Department of Agronomy, University of California, Riverside, California, 92502.



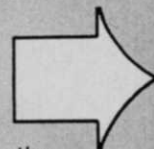
THE KEY TO EFFECTIVE BRUSH CONTROL

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

This "key" series will include the following topics:

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

CUT OUT AND SAVE FOR REFERENCE



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

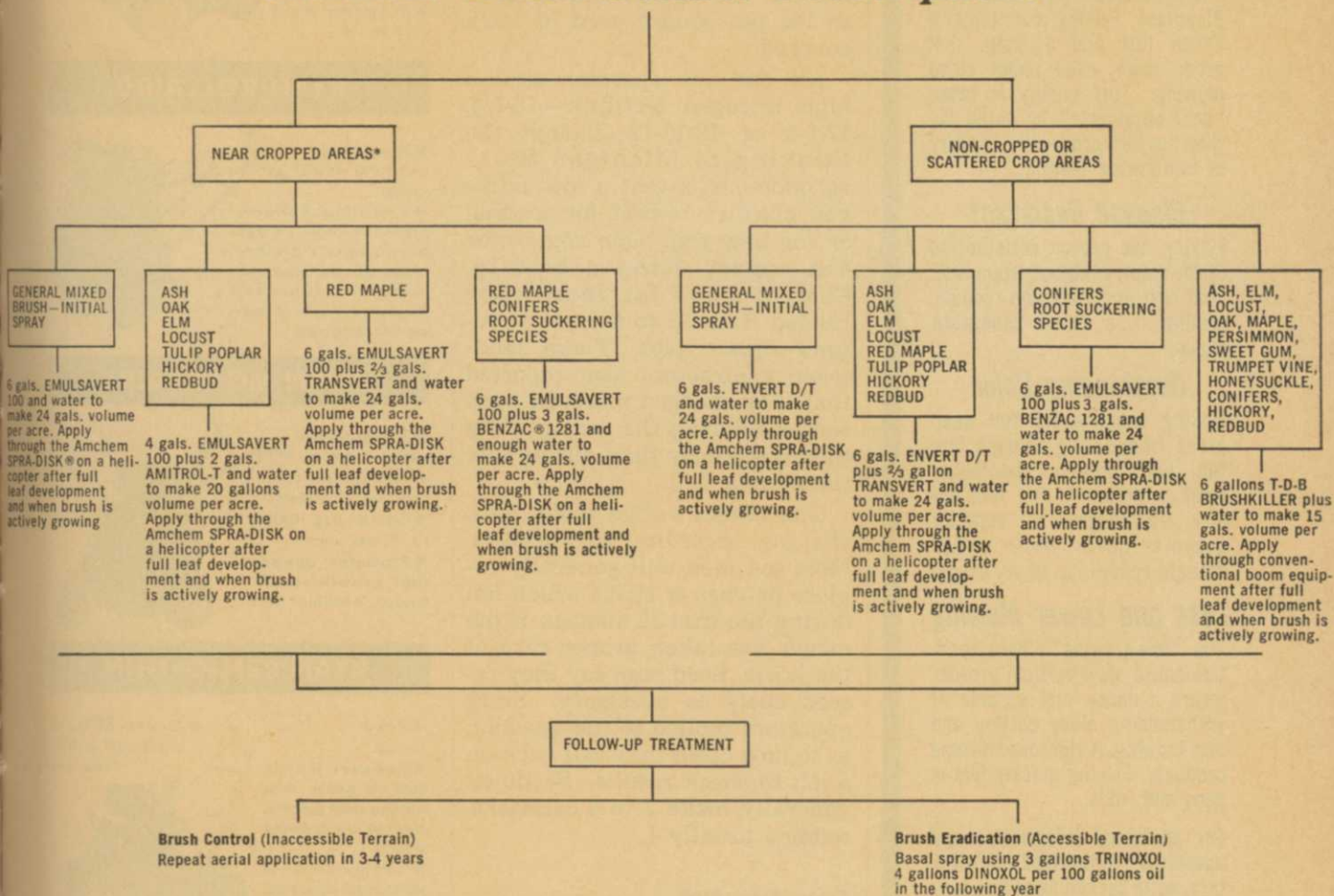
PART TWO OF A FOUR-PART SERIES

No. 1 (Chemical Control of Mixed Brush) available on request.



THE KEY TO AERIAL APPLICATION

Chemical Brush Control Prescriptions



*Do not spray immediately adjacent to crops. Allow a buffer between sprayed area and crop. Aerial application of herbicides near cropped areas requires great care on the part of the pilot. Secure only the most experienced pilots and insist on EMULSAVERT 100, the only non-volatile, low drift formula which will carry chemical additives in the water phase.

For specific problems not covered here contact your nearest Amchem representative or write Amchem Products, Inc., Ambler, Pennsylvania

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FYLKING* KENTUCKY BLUEGRASS

Quality Rarely Equaled

A distinctively-new Kentucky Bluegrass, Fylking maintains a dense turf and a deep, rich green color, even under close mowing. Turf quality is rated "best obtainable" by noted authorities, as proven by 5 years of nationwide testing.

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Fylking has proven resistant to Stripe smut, Leafspot, Stem rust, Leaf rust and Fusarium roseum, making it a prime bluegrass choice.

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Fylking sustains its full deep green from spring through late fall. Early greenup and longer color retention in the fall, are plus advantages to superior summer color, even under drought conditions, heavy usage.

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The "low-growing" characteristics cause slow vertical growth, insure a dense turf capable of withstanding close cutting and less mowing. A vigorous rhizome producer, Fylking quickly fills in gaps and voids.

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

*This variety is licensed internationally, solely and jointly to Jacklin Seed Co., Inc., Dishman, Wn., and Hogg & Lytle Seeds, Oakwood, Ontario, Canada.

Contractor Prices Vary Little In Detroit Area

Who shows the best net profit? The landscape contractor who sods the new lawn, or the one who seeds? Donald D. Juchartz, county agent, Wayne County, Mich. recently put this question to 400 operators in the Detroit area. Replies showed that it depends on what the operator is best geared up to handle. Those who have the equipment and skilled help to do both jobs equally well say they make the best profit on seeding lawns.

Charges ranged for each operation. Operators charged 80c to \$1.50 per yard for sodding, though most were in the \$1 to \$1.25 bracket. For seeding, charges ran from 35c to \$1 per yard, most being 65c to 70c. For adding 2" of good topsoil when needed, the charge has been 5c to 10c per square yard of lawn covered.

All but one operator used a high nitrogen fertilizer—10-6-4, 12-8-4 or 12-12-12—though the thinking of Michigan State agronomists is that a low nitrogen mixture is best for seeding or for new sod. One contractor did report using a 5-10-10. Charges made for fertilizing ranged from \$5 to \$10 per thousand square feet. These landscape contractors also reported that they charged more for such services during the spring when they were busy than during late summer or fall.

Guarantees varied along with charges, according to Juchartz. Most sod men will generally replace patches or strips which fail during the first 12 months, if the owner has taken proper care of the lawn. Seed men say they reseed spots as necessary. Sixty operators replied to the question as to how often they call back on a job to check results. Seedmen generally make 2 to 4 callbacks, sodmen usually 1.

Crew Size And Recommendations Vary

Contractors laying sod normally used crews ranging from 2 to 5 men with equipment. Seeding crews number from 2 to 3 plus equipment. These Detroit

Take the high-speed Ryan Route to beautiful turf...

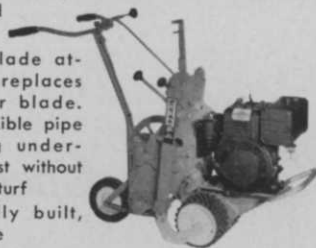
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RYAN JR SOD CUTTER

- Cuts over 11 sq. yds. of sod per min.

- Mole blade attachment replaces sod cutter blade. Installs flexible pipe or tubing underground fast without disturbing turf

- Ruggedly built, easy to use



RYAN ROLLAIRE

- Handy back-and-forth power rolling

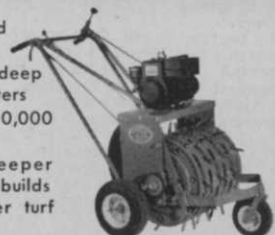
- Vibrating Rollaire provides over 1/2 ton compaction. Vibratory action can be engaged, disengaged as you roll
- Has many uses including blacktopping



RYAN MOTORAIRE

- Self-propelled coring aerator

- Pulls uniform, deep cores on 5" centers
- Covers up to 10,000 sq. ft. per hour
- Promotes deeper root growth—builds thicker, healthier turf



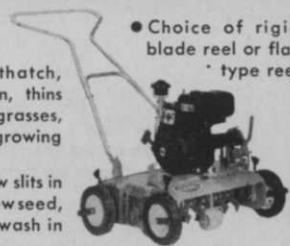
RYAN REN-O-THIN

- Power raking

- Removes thatch, controls grain, thins running stem grasses, cuts out low growing weeds

- Cuts narrow slits in soil to catch new seed, let fertilizer wash in

- Choice of rigid blade reel or flail type reel



Mechanize your maintenance work—
write for complete information!

Ryan

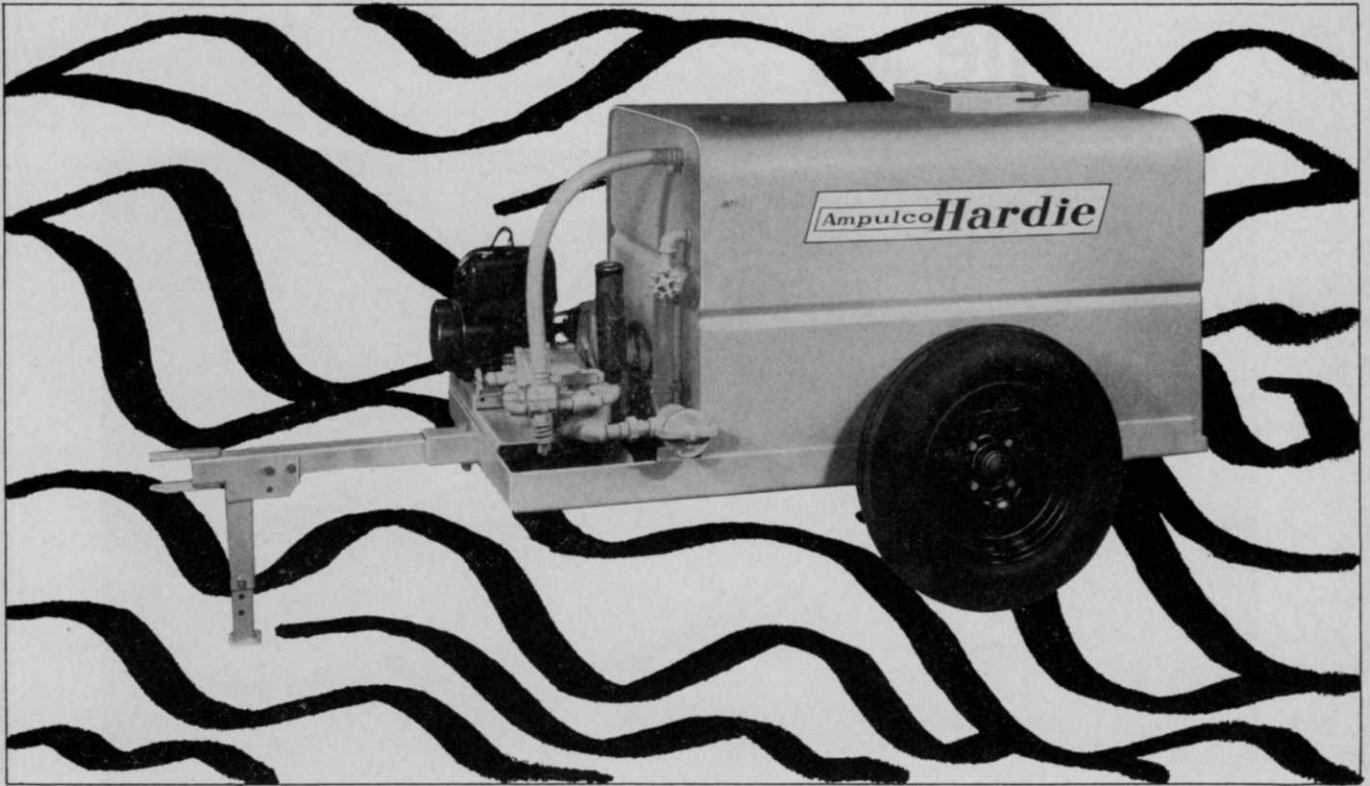
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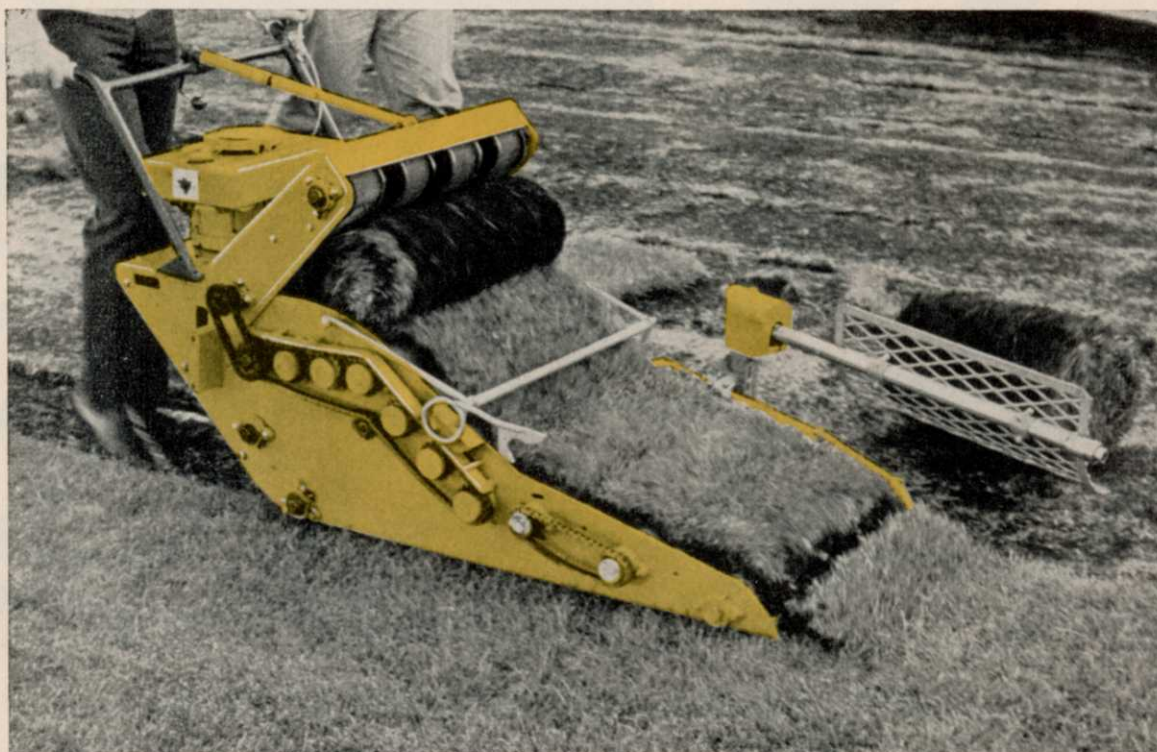
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■ 24" WIDTH . . . \$2500.00

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A happy sod rolling season to you and thanks to all the Michigan and out of state sod growers who have placed orders for the little SODWINDER. We feel that you also will have the same confidence in the SODWINDER when you see it in operation. So come down and visit our factory now, if you can. We will demonstrate to you how simple and effortless the SODWINDER rolls up to 1500 yds. per hour. Our new 1967 models now in production are equipped with a combination right and left hand sod ejection mechanism and other improvements. Reverse gear. Beltless sod transport. Practically maintenance free. Five years in development and field testing assures you that the SODWINDER will do a completely satisfactory job in your particular field, be it muck, top soil, peat, clay, sand or stony terrain. I personally will see that you will receive prompt and courteous service.

With Best Regards,

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area operators figure they get about 100 yards per man day in sodding. In a seeding operation, they figure on 200 yards per man day.

How does the landscape contractor prepare the homeowner to keep the new lawn? Juchartz says there is also a great variation here. And it's at this point that he feels contractors need to get together and agree on recommendations, that is, for the area they serve. Good use could be made of a garage sheet or leave piece of some type containing instructions which would help insure success of the new job. Recommendations given for this area by the operators replying usually called for daily watering the first 10 to 20 days and then gradually tapering off, monthly fertilizing, mowing at a 1½-inch height, and no use of weedkiller.

Biggest problems in doing the job were listed as the same for both seeding and sodding. These were obtaining proper grade, fighting compacted soil, and getting the homeowner to spend enough money to do the job right.

Thinking of the contractors about what the industry needs most centered on two major points. First, more education for the public. And secondly, state inspection of sod to insure standards.

Chemical Residues Leave Soil by Various Routes

Contract applicators concerned about chemical residues in the soil—as an aftermath of spraying for weed or insect control—have a number of natural forces working in their favor, it is reported by the Institute of Agriculture, University of Minnesota.

One of these forces, and a primary one, is microbial decomposition. Tiny soil microorganisms attack virtually all chemical molecules in one way or another.

There are other ways in which pesticides are lost or inactivated. Some are lost through vaporization (volatilization). Some residues leach down into the soil where they cause no further problem.

Some disappearance is due to

plant removal or the breakdown of pesticide molecules as they are taken up by plants. Finally, there is some chemical breakdown of pesticides, although very little has been proven by research to occur.

Since soil microorganisms are so important, they have long been in the scientific limelight where the residue problem is concerned. According to Russell Adams, Jr., soil chemist at the University, there seems to be no pesticide molecules that will not be attacked eventually by some soil microorganisms.

Considerable concern has been voiced about adding unnatural organic compounds to soil. However, recent research has shown that chlorinated hydrocarbons can undergo breakdown through action of soil microorganisms.

Microorganisms Can Adapt To A Pesticide

Apparently, microorganisms can adapt themselves to a pesticide. In one study, organisms were subjected to 2,4-D, and a lag period elapsed as the compound was slowly and then more rapidly attacked as the metabolizing organism developed.

Then, later additions of 2,4-D were more quickly decomposed.

There is some scientific controversy over how this adaptation develops—whether it is due to formation of enzymes or mutations. In any case, once an organism becomes able to break down a pesticide, it retains this ability for some time.

Do insecticide or herbicide chemicals affect microorganisms? At normal field applications, research shows, there is rarely any effect. In some cases, small quantities of pesticides actually stimulate microbial activity.

Another important factor in pesticide residues is sorption, or the process by which soil takes up and holds the chemical. Importance of sorption—adsorption or absorption—of molecules depends on the type of soil.

Organic residues disappear most quickly from sand, but develop strong bonds with clay, particles of which have charged sites on the surface. Pesticides

Meeting Dates



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

Western Aerial Applicators Short Course, Landis Auditorium, Riverside City College, Riverside, Calif. Apr. 3-4.

Western Aerial Applicators Short Course, Caravan Inn, Sacramento, Calif., Apr. 5-6.

Canadian Chapter, International Shade Tree Conference, Annual Convention, Holiday Inn, Ottawa, Ontario, Apr. 27-28.

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

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

Florida Nurserymen and Growers Association, Annual Convention, Robert Meyer Motor Inn, Orlando, May 25-27.

The Hyacinth Control Society, Annual Meeting, Holiday Inn, Fort Myers, Fla., June 18-21.

American Association of Nurserymen, Annual Convention, Americana Hotel, Bal Harbour, Fla., July 8-13.

Third National Grassland Field Day and Conference, University of Nebraska, Lincoln, July 12-14.

Miss Lark Trade Show and Convention, Convention Auditorium, Hot Springs, Ark., Aug. 10-12.

Penn State 1967 Field Day, Pennsylvania State University, University Park, Aug. 16-17.

Nursery and Garden Supply Show, Texas Association of Nurserymen Annual Convention, City Auditorium, Austin, Aug. 20-23.

International Shade Tree Conference, 43rd Annual Convention, Marriott Motor Hotel, Philadelphia, Pa., Aug. 27-31.

Texas Fertilizer Association's 1967 Agricultural Exposition, KoKo Inn, Lubbock, Nov. 9-10.

which are taken up to these charged sites are *adsorbed*, and are thus inactivated.

However, molecules taken up in such a way are a constant source of the pesticide in the soil solution.

Insect Report

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

Turf Insects

A CHINCH BUG (*Blissus insularis*)

Texas: Adult feeding noted in several lawns at Houston, Harris County. This early emergence probably due to unseasonably warm weather but could result in early buildups in advent of warm, late winter.

A MEALYBUG (*Chorizococcus rostellum*)

California: Locally medium on Bermuda grass at La Mesa, San Diego County.

Ornamentals

APHIDS

Alabama: Overwintering *Eriosoma lanigerum* heavy on roots of several flowering crab apple trees in Lee County. **Arizona:** *Macrosiphoniella sanborni* increased on and damaged ornamentals in Phoenix area of Maricopa County. *Myzus persicae* heavy on ornamentals in all areas of Maricopa County. **California:** *Myzocallis arundinariae* nymphs and adults heavy on bamboo at Santa

Barbara, Santa Barbara County. **Oklahoma:** *C. tujafilina* continues light to moderate on evergreens in Payne County and moderate in Cleveland County.

BAGWORMS

Alabama: Numerous bags of *Thyridopteryx ephemeraeformis* observed throughout State contained large numbers of eggs. Parasitism appears low. **California:** *T. meadi* medium on native greasewood at Apple Valley, San Bernardino County. **New Mexico:** "Bags" of undetermined species very abundant on junipers at Portales, Roosevelt County. Some pupae parasitized.

GRANULATE CUTWORM (*Feltia subterranea*)

Arizona: Larger than normal populations damaged ornamentals in the Phoenix area of Maricopa County.

A PYRALID MOTH (*Herculia intermedialis*)

Illinois: Larva collected from juniper in Champaign, Champaign County; adult was reared. This is a new state record.

ARMORED SCALES

Maryland: *Unaspis euonymi* heavy on euonymus at location in Silver Spring, Montgomery County.

COCONUT SCALE (*Aspidiotus destructor*)

Pennsylvania: Heavy on blue spruce at Havertown, Delaware County. This is a new state record.

Tree Insects

ARBORVITAE APHID (*Cinara tujafilina*)

California: Nymphs and adults heavy on juniper at Huntington Beach, Orange County.

A PINE APHID (*Cinara* sp.)

Oklahoma: Heavy on pines in many areas of McCurtain and Pushmataha counties in mid-February. Trees checked this period show parasites and birds completely destroyed most infestations.

PINE BARK APHID (*Pineus strobi*)

Maryland: Light to medium on young white pines at Laurel, Prince Georges County.

A BARK BEETLE (*Phloeosinus* sp.)

California: Adults heavy on cypress at Lucerne Vally Park, Lucerne, San Bernardino County.

BLACK TURPENTINE BEETLE (*Dendroctonus terebrans*)

Oklahoma: Infesting occasional pine trees near America, McCurtain County.

EASTERN TENT CATERPILLAR (*Malacosoma americanum*)

Kentucky: A statewide egg-mass survey was conducted in portions of Letcher, Morgan, Menifee, Powell, Bath Montgomery, Marion, Taylor, Casey, Green and Adair counties. Intensity of damage may increase compared with 1966.

DOGWOOD CLUB-GALL MIDGE (*Mycodiplosis alternata*)

Alabama: Galls heavy on native dogwoods throughout State.

A SPIDER MITE (*Eotetranychus libocedri*)

California: Eggs and adults infested juniper at Highland, San Bernardino County.

CALIFORNIA OAKWORM (*Phryganidia californica*)

California: Larvae heavy on oak trees at St. Helena and Yountville, Napa County. Larvae about one-third grown. Early occurrence of larvae indicates another year of severe defoliation unless virus disease currently present in some specimens becomes effective.

AN ARMORED SCALE (*Phenacaspis heterophyllae*)

Florida: Collected on loblolly pine at Melrose, Putnam County. This is a new county record.

EUROPEAN ELM SCALE (*Gossyparia spuria*)

California: Medium on elm at Escondido, San Diego County.

A WHITEFLY (*Aleuroplatus gelatinosus*)

California: Nymphs heavy on oak trees at Fresno, Fresno County.



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

Limnological Aspects of Recreational Lakes

by K. M. Mackenthun, W. M. Ingram, and R. Porges, Public Health Service Publication No. 1167, Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402, 1964, 176 pp., \$1.25.

Aquatic weed controllers, alert! THE book has finally been written. Biologists and water purity experts of the Robert A. Taft Sanitary Engineering Center in Cincinnati, Ohio, a division of the Public Health Service, have gleaned information from many previous and scattered works on aquatic weeds and pests which affect water supplies. They've put it together in a volume slanted toward the future needs of society which demands clean recreational waters.

In a nutshell, L. A. R. L. is not a how-to-do-it handbook, but rather a how-to-figure-out-what-to-do treatise. It is designed for anyone who must, says the Foreword, "interpret biological phenomena of recreational lakes." This includes commercial weed controllers, extension agents, water pollution inspectors, water commission agents, and lake managers. The book is simply written, and can be understood with a minimum of biological background. Terms are well defined in the text and there is a 3-page supplementary glossary.

The authors examine physiochemical factors in "healthy and unhealthy" lakes. They discuss productivity in terms of animals, plants, and weeds. Factors causing excessive weeds are clearly explained.

There is an excellent section on specific weeds, well illustrated with 29 plates, and including keys to important species of algae and higher weedy plants.

A chapter on animals which affect water use discusses such pests as midges, mosquitoes, leeches, swimmers' itch organism, and snails.

An important chapter tells about sampling and testing techniques used by the PHS and others to determine chemical, physical, and energy factors influencing lake conditions. This

section gives valuable insight into weed problems.

Weed growth of a lake is part of its productivity. When excessively fertile, or for other reasons, a lake may overproduce, and if the water has an intended use which the weed crop hampers, the extra growth must be controlled. Authors point out the uses of various chemicals, their effects and side effects. There are seven mechanical and chemical spray rigs pictured in this chapter on control. Plans for a spray outfit are included.

A quick look at the voluminous references in each chapter shows how much source material was used, and gives many leads for readers' edification.

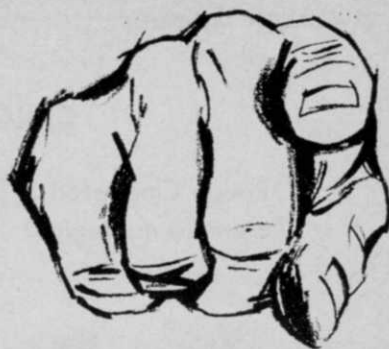
In our opinion authors Mackenthun, Ingram, and Porges have done an admirable job on this much-needed book. An aquatic weed controller couldn't make a better investment for \$1.25.

Arps PTO Stump Cutter For One-Man Operation

Only one man is needed to operate the new "Stump Master" stump cutter from Arps Corp., according to the maker. Designed for mounting on any hydraulically equipped 3-point hitch tractor of 40 hp. or more, Stump Master can be controlled by four hydraulic levers located on the driver's panel so he does not have to leave the tractor.

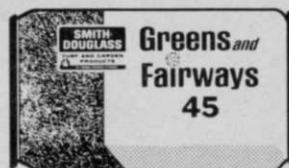
A heavy-duty ball clutch power shaft connected to the rear PTO of the tractor powers the 36-in.-diameter steel cutting wheel. Carbide-tipped cutting teeth are said to be capable of reducing a cubic foot of wood per minute.

Easy maneuverability marks Stump Master, Arps maintains. A pivot allows the hydraulic cylinder to swing the entire cutting unit through an arc of 30°, increasing the cutting range and eliminating excessive tractor maneuvering. Safety-shielded, the Stump Master can be used in limited spaces and is designed for highway and forestry departments, municipal maintenance, landscape contractors, etc. Arps Corp., New Holstein, Wis. 53061, offers illustrated data on this new cutter.

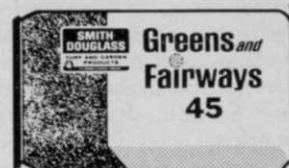


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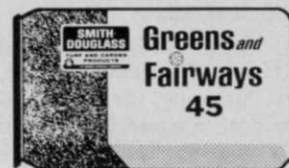
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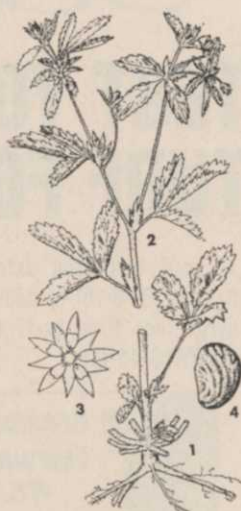
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CINQUEFOIL

Rough Cinquefoil
(*Potentilla norvegica*)



Upright Cinquefoil
(*Potentilla recta*)



Rough cinquefoil, sometimes commonly called barren strawberry or tall five-finger, is an annual, winter annual, or biennial. It spreads by seed. Normally this weed is found along roadsides, waste areas, in meadowland or pastures. It frequents dry soils. Plants are able to withstand drought and thrive from June until October, and are found in eastern two-thirds of the United States from Mason-Dixon line northward into Canada. It was introduced from Eurasia, though some forms appear to be native to North America.

Rather stout stems are rough, hairy, and can be semierect or spreading. Note base of plant and roots (1). Leaves are palmately divided and resemble strawberry plants with 3 leaflets (2). Small flowers grow in clusters at tips of branches (3). Petals are yellow. Seeds are about $\frac{1}{32}$ inch long and light brown (4). Plants grow 1 to 3 feet tall.

Upright cinquefoil or sulphur cinquefoil like the rough cinquefoil is also a dry weather plant. It thrives from June through August on dry, gravelly, or stony soils. Is most troublesome in limestone regions. Eastern half of Minnesota and Iowa, and most of Missouri form western boundary of infestations. Plant ranges eastward over same area as rough cinquefoil. It was originally introduced from Europe.

Leaves are alternate and palmately divided with 5 to 7 coarsely toothed leaflets (5). Shallow root system (6) can be destroyed by cultivation. Plant, with erect or spreading and hairy stems, grows 1 to 3 feet tall (7). Flowers about 1 inch (8), are perfect, regular and found in many-flowered, compact, and almost leafless cymes. Calyx is hairy. Plant is a perennial and reproduces by seed (9).

Both types of cinquefoil are susceptible to 2,4-D at rates of 1 pound per acre. Clean cultivation or mowing when flowers first appear are also claimed to control this weed.

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

Cables, Braces Help Shade Tree Survive Violent Storms

Installation of cables and braces to give branches additional strength is decidedly useful in preventing storm damage to the tree, repairing injuries, and as a safety measure when large limbs overhang buildings or other property.

In some trees, either as an inherent characteristic or because of improper pruning when young, major branches develop from a narrow-angled, V-shaped crotch. As the branches increase in diameter they become tightly appressed, but the bark in the crotch below the point of apparent junction acts as a barrier that hinders or prevents the growth of uniting wood fibers. As a result of this weak union, splitting at the crotch is likely to occur during a storm or even from the weight of abundant foliage. Often the splitting is so severe that the tree is damaged beyond satisfactory repair.

Since these structurally weak crotches develop gradually over a period of years and are obvious long before splitting occurs, there is ample opportunity for protective treatment. If the tree is young and vigorously growing, often one of the two branches may be removed without permanently impairing the shape and beauty of the tree.

In mature trees where branches growing from tight crotches are of equal importance, the National Arborist Association recommends that mechanical support be provided. Usually this consists of installing one or more brace rods at the crotch and placing a system of flexible wire cables high in the crown of the tree, thus "tying" the major branches together. In repair treatment where crotch splitting has occurred, the branches are drawn together with block and tackle until the crack closes; then the brace rods and cables are installed.

In aged trees that stand near a house, large branches of great weight frequently overhang the roof. While these branches may appear perfectly sound, there is

always the danger that they may break during storms and cause extensive damage to the building. This danger may be substantially reduced by properly installed supporting cables.

In attaching cables to branches, screw hooks with lag threads are generally used; never is the cable wrapped around the branch. Skill and experience are needed to locate the cables in the tree so they will function most effectively.

Dowpon Chemical Lawn Edger

A chemical can now be used to accomplish one of the more difficult chores of lawn management, reports J. P. Fullmer, Clemson University horticulturist. Checking on the use of Dowpon as a lawn edger, Fullmer finds users are said to be highly pleased with this herbicide.

"Edging with Dowpon is now one of the easiest jobs," Fullmer says.

To chemically edge unwanted grass from walks, driveways, trees, and flower beds, a compressed air knapsack sprayer is used. This sprayer should be used exclusively for herbicides since residual weedkilling chemicals remaining in the sprayer could injure or kill plants if you were to use it for other spraying jobs later.

Mixing two tablespoons of Dowpon for each gallon of water makes an effective solution. Direct spray on unwanted grass enough to wet the leaves and avoiding runoff, Fullmer recommends.

Two applications are required to give a satisfactory kill. A second spraying 7 to 10 days following the first will give good results. Applications may have to be repeated during the growing season.

Dowpon may be used to edge grass around some trees and shrubs. But since the material does injure some plants, Fullmer makes no blanket recommendation. Applicators can obtain more information about Dowpon by writing to The Dow Chemical Co., Midland, Mich.

Why the spring-activated feed plate —
an exclusive feature of the

FITCHBURG CHIPPER SAVES YOU MONEY!



Take a good look at the Fitchburg feed plate. It's patented — no other chipper has this feature. Because the feed plate is *spring-activated*, it "gives" and automatically adjusts to size of wood, up to the machine's rated capacity. Result: No sudden shocks to rotor assembly, engine can be run on lower r.p.m., chipping is smoother, quieter and faster.

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FREE — Get full facts about Fitchburg Chippers. Write to the Fitchburg Engineering Corporation, Dept. WTT-62, Fitchburg, Mass.

*Optional Equipment

FITCHBURG ENGINEERING CORPORATION



Uniform granular herbicide or fertilizer application is said possible with the Evergreen spreader introduced by Evergreen Helicopters Inc., McMinnville, Oregon.

Helicopter Device Makes Dry Aerial Spreading Possible

Fast, uniform, and economical applications of granulars by air is possible for the first time with its newly patented spreading device, Evergreen Helicopters Inc., McMinnville, Ore., claims.

Dry chemicals and fertilizers for the first time can be broadcast from the air with uniform material flow at rates ranging from 10 to 1,000 lbs. per acre, according to Delford M. Smith, president of the pioneer commercial helicopter-operating firm.

"Although the need for such a device by helicopter operators has been long standing, because certain conditions demand dry rather than wet chemicals, the only efficient systems marketed to date are for spraying liquids," Smith said.

The new device is said to handle up to 800 lbs. per minute. Helicopters can spread full payloads of fertilizer in 60 seconds covering ground with a maximum 120-foot swath.

Inherent characteristics of the Evergreen spreader include: forward broadcast so the pilot has visual control; immediate re-

sponse to on-off control; and no caking problems because of a method of chemical transfer to slinger, the firm reports.

For brush control, Evergreen has found the device provides customers with a total service package.

More information about the helicopter spreading system is available at Evergreen Helicopters, Inc., P.O. Box 382, Municipal Airport, McMinnville, Ore.

Use Right Chemical Tool For Weed Control (from page 23)

emergence treatment for broad-leaf weed control would still be required.

Another example: if a lawn or turf area contains mixed stands of dandelion, plantain, sheep sorrel, and common chickweed, the standard 2,4-D treatment would not be satisfactory because of the presence of two 2,4-D-tolerant species. A dicamba-2,4-D combination would be a better choice. Again, if prostrate knotweed were present beyond the seedling stage, the inclusion of dicamba or comparable material would become essential.

say goodbye

to these weed and disease pests in your turf—

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

Annual bluegrass	Foxtail
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Browntop panicum	Lovegrass
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Chickweed	Spurge
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Fall panicum	Texas millet
Florida pussley	Witchgrass

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Broomweed	Pennywort
Carpetweed	Peppergrass
Chickweed	Plantain
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Croton	Puncture Vine
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Dock	Shepherd's Purse
Fan Weed	Spurge
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Morning Glory	Yarrow
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Blights—
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All-out control of weeds and disease, all season long, from one source—Diamond Alkali Company, Agricultural Chemicals Division, 300 Union Commerce Building, Cleveland, Ohio 44115



Diamond Chemicals



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

say goodbye to weeds and disease in turf.



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Chemicals**

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With Diamond, you can make war on weeds and disease . . . and win. Write for FREE booklet on all-out weed and disease control to Diamond Alkali Company, Agricultural Chemicals Division, 300 Union Commerce Building, Cleveland, Ohio 44115.

Geigy Markets Atratul 8P, New Granular Weedkiller

A pelletized herbicide, whose broad-spectrum weedkilling range is said to include both deep-rooted broadleaf and grassy weeds, is now being marketed by Geigy.

This new atrazine formulation, Atratul 8P, is recommended by Geigy for use around plant sites, rights-of-way, lumberyards, petroleum storage farms, and similar areas. Atratul 8P may be applied on all types of soils either before or after weeds emerge, regardless of the amount of rainfall in the area, according to the company. A single application will kill tough perennials as well as most annual weeds and grasses and also prevent new growth for a full season or more, it claims.

For control of annual broadleaf weeds and grasses, Geigy says apply 1/4 to 1/2 lb. per 100 sq. ft. of soil surface, while a rate of 1/2 to 1 lb. per 100 sq. ft. is advised for perennial weeds and grasses. In areas of high

rainfall, long weed growing seasons, and where extended residual control is desired, the higher rate is suggested.

For details on Atratul 8P, write Geigy Agricultural Chemicals, Division of Geigy Chemical Corp., Ardsley, N. Y.

McCulloch Offers New Chain Saw, Claims 30% More Power

McCulloch Corp. has just introduced the MAC 4-10, a lightweight chain saw, claimed to be 30% more powerful than previous models in the MAC-10 series.

Designed for the power-conscious user, MAC 4-10 has 30% higher torque and a 30% larger fuel tank. Other innovations include a larger displacement for more power, new double carburetor for a better fuel mixture, larger exhaust port for power, and a fully automatic chain-oiling system with manual override for complete chain lubrication at all times.

For full data and prices, contact McCulloch Corp., 6101 W.

Century Blvd., Los Angeles, Calif. 90045.

J. I. Case Adds Trencher to Line

J. I. Case Co. has added a new, heavy-duty, rear-mounted trencher to its line of attachments and implements. The new trencher, model 1200, is designed for use with Case's model 190 compact tractor, and is said to meet requirements of contractors, utilities, and municipalities for digging water and drainage trenches.

With speeds up to 21 ft. per minute, trenching widths and depths can be adjusted in a range from 4" wide by 5' deep to 12" wide by 2 1/2' deep, Case says. Digging boom can be raised and lowered hydraulically from the operator's seat, according to the company, which sells the equipment through all its tractor dealers.

Specifications and other information on the new trencher are available from the J. I. Case Co., Racine, Wis.

Treat Your Soil Right!

New LINDIG Low-Temperature Aerated Steam System



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

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

gens. Soil does not become toxic, is not logged with moisture.

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

For complete information and free literature, write



1875 West County Road C, St. Paul, Minnesota 55113

Even

"MAKES THE GOOD EARTH A BETTER"

Classifieds

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

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

HELP WANTED

NATIONAL MANUFACTURER of lawn and garden products is adding a salesman in Philadelphia-New Jersey area. Nationally known name. Good salary, commissions, benefit programs. Write in confidence to Box 25, Weeds Trees and Turf magazine. (An Equal Opportunity Employer)

AGRONOMIST OR BOTANIST. If you have B.S. or M.S. in either of above fields, then we would like to talk to you about our industrial weed control service. Send complete resume to Western Soil Management Corp., 3909 Baltimore Ave., Philadelphia, Pa.

OPPORTUNITY. Man to assist owner as landscape foreman and management of established nursery, garden shop, and landscaping operation in Indiana. Requirements: pleasant personality, ambitious, understanding of plant material. Excellent wages, paid vacation, yearend bonus, fringe benefits, plus opportunity for industrious man to acquire ownership. Please reply to Box 24, Weeds Trees and Turf magazine.

WANTED TO BUY

HIGH-PRESSURE sprayers, skid or truck mounted, prefer 500-1500 gal. tank capacity. Paul Kucik, 17207 Archdale, Detroit, Mich. KE 3-8589.

Cushman Introduces Four Utility Turf Vehicles

Four new utility vehicles for golf course, park, cemetery, and estate turf work have joined Cushman Motors' Turf-Truckster. Largest is the 18 hp. Hydraulic Dump Body Turf-Truckster, which can be used for such dumping tasks as applying top dressing to greens, gravel to paths, sand to traps, etc.

Truckster's hinged tailgate opens from top, or driver can open it from the bottom by use of a lever near his seat. Or, its tailgate can convert into a seat for carrying extra personnel. The "Minute-Miser" is a lightweight unit for quick, convenient transportation. Cushman's "Lobster" features a front-mounted

cargo bed for carrying equipment and supplies.

The 8-hp. Turf-Truckster offers a load capacity of 1,000 lbs. for hauling fertilizer and heavy supplies, such as hand mowers. Illustrated brochures describing these new turf vehicles can be obtained by writing Cushman Motors, Lincoln, Nebr. 68501.

Literature you'll want

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

1963 Dutch Elm Disease Report and Conference Summary, Wisconsin Dept. of Agriculture, Plant Industry Division, 448 W. Washington Ave., Madison 3, Wisconsin, 39 pp.

Better Lawns—Establishment, Maintenance, Renovation, Lawn Problems, Grasses, Rev. 1962., 32 pp. il., Catalog No. A. 1.77:51/4. Superintendent of Documents, U. S. Govt. Printing Office, Washington, D. C. 20402, 15¢.

Cornell Recommendations for Trees and Shrubs, 32 pp. il., Agricultural Extension Service, Cornell University, Ithaca, N. Y.

The ABC's of Good Lawns, Extension Circular 115, Agricultural Extension Service, University of Delaware, Newark, Delaware.

Lawn Insects—How To Control Them, Rev. 1964, 24 pp. il., Catalog No. A 1.77:53/2, Superintendent of Documents, U. S. Govt. Printing Office, Washington, D. C. 20402, 15¢.

Tree Diseases, Description and Control, Bulletin No. 74, Agricultural Extension Service, University of Delaware, Newark, Del.

The Dutch Elm Disease and Its Control, Rev. 1964, 12 pp. il., Catalog No. A 1.75:193/2, Superintendent of Documents, U. S. Govt. Printing Office, Washington, D. C. 20402, 10¢.

Fungicides for Lawn Disease Control, Bulletin BP-7-4, Agricultural Publications Office, Agricultural Experiment Station, Purdue University, Lafayette, Ind., 5¢.

Checklist of Native and Naturalized Trees of the United States (Including Alaska), Catalog No. A 1.76:41, 1957, 472 p., \$3.00, Superintendent of Documents, Government Printing Office, Washington, D.C.

Pruning Deciduous Shrubs and Woody Vines, Publication No. F 281, 1965, Agricultural Experiment Station, University of Michigan, East Lansing, Michigan.

Advertisers

INDEX TO ADVERTISERS	
Amchem Products, Inc.	36, 37
AG-KING, Subsidiary of Tidewater AG Systems	4
John Bean Div., FMC	31
The Borden Chemical Co., Smith-Douglass Div.	43
Diamond Alkali Co.	2a, 2b, 46, 47
E. I. duPont de Nemours & Co., Inc.	21
Fairfield Chemicals, Niagara Chemical Div., FMC....	7
Fitchburg Engineering Corp.	45
Geigy Agricultural Chemicals ...	29
Harder Arborist Supply	23
Hardie Sprayers	39
Hercules Incorporated.....	22, Back Cover
Hooker Chemical Corp.	17
International Harvester Co....	10, 11
Jacklin Seed Co., Inc.	38
Jacobsen Manufacturing Co.	35
Lindig Manufacturing Co.	48
Merck Chemical Div., Merck & Co., Inc.	27
Miller Distributor, Inc. ...	2nd Cover
Piro Research & Development Corp.	40
B. G. Pratt Co.	42
Ryan Equipment Co.	38
Seymour Smith & Son, Inc.	32
Stone Conveyor Co., Inc.	6
Thompson-Hayward Chemical Co. 3 Union Carbide Corp., Chemicals Div.	8, 9
Universal Metal Products Div....	5

Ground Covers for Highway Slopes—An Annotated Bibliography. Investigation No. 615, June 1965, L. E. Foote, Agricultural Engineer, Minnesota Department of Highways, St. Paul, Minn. 55101.

Calibration of Pesticide Applicators. Circular No. 275A, Mail Room, Rolfs Hall, Agricultural Extension Service, University of Florida, Gainesville, Fla.

Using Phenoxy Herbicides Effectively. Catalog No. A 1.9:2183, 1962, 24 pp. il., 15¢, Supt. of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

Waterweed Control on Farms and Ranches. Catalog No. A 1.9:2181/2, Rev. 1965, 22 p. il., 15¢, Supt. of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

Chemical Control of Brush and Trees. Farmers' Bulletin No. 2158, Nov. 1964, Office of Information, U. S. Dept. of Agriculture, Washington, D. C. 20250.

The Elm Leaf Beetle. Leaflet No. 184, Rev. Aug. 1962, Office of Information, U. S. Dept. of Agriculture, Washington, D. C. 20250.

Lawn Diseases, How to Control Them. Home and Garden Bulletin No. 66, Rev. Aug. 1962, Office of Information, U. S. Dept. of Agriculture, Washington, D. C. 20250.

Roselawn St. Augustinegrass as a Perennial Pasture Forage for Organic Soils of South Florida. Bulletin No. 689, Mail Room, Rolfs Hall, Agricultural Experiment Station, University of Florida, Gainesville, Fla.

Common Trees of Puerto Rico and the Virgin Islands. 1964, 548 pp. il., cloth, \$4.25, Supt. of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

Suppliers Personnel Changes

Allis-Chalmers Farm Equipment Division, Milwaukee, Wis., has named William L. Barber merchandising manager. With responsibility for the introduction, promotion and sales of the farm equipment line, Barber succeeds Raymond C. Doggett, who moves to Dallas, Tex., as manager of the division's branch there.

Amchem Products, Inc., Ambler, Pa., reports that M. B. Turner has been designated general manager of its Agricultural Chemicals Division. He will direct all phases of the division's operation, including sales, research, and production.

The Ansul Co., Marinette, Wis., announces three executive appointments and two additions to the marketing staff of its Chemical Products Division. Henry E. Arkens becomes division marketing manager; Robert E. Lucas is now market manager for plant control chemicals; and Franklin W. Wedge has been named manager of special sales of agricultural and industrial chemicals. Thomas D. Powers and John R. Fernandez join Ansul's marketing staff. Powers will serve as marketing specialist in agricultural chemicals based in Houston, Tex., and Fernandez is slated to specialize in international marketing for Ansul's chemical products.

Armour Agricultural Chemical Co., Atlanta, Ga., has selected Mike W. Tustian as national accounts sales manager for lawn and garden products. A turf chemical specialist, Tustian will direct sales and service for Armour's Vertagreen plant foods and chemical products.

John Bean Division of FMC Corp., Lansing, Mich., reports Charles E. Taylor has recently joined John Bean as district agricultural sales manager for Illinois.

The Dow Chemical Co., Midland, Mich., has consolidated all plant science development functions under the management of Dr. Mark G. Wiltse, who will direct field development groups and product technical specialists.

Elanco Products Co., division

of Eli Lilly and Co., Indianapolis, Ind., has added two sales representatives to its agricultural chemical division, and has promoted Joel H. Stonecipher to field sales manager. Stonecipher will direct agricultural chemical sales in the north-central states and will headquarter in Omaha, Nebr. New sales representatives are Henry A. Holdman, temporarily assigned to a Texas territory, and Evan G. Purser, who will cover Washington and part of Oregon.

Dow Introduces New 'Copter Spray System

Pilot-operated herbicide flow control gives the new Dow Chemical Co. helicopter spray system ability to adjust swath width as much as 25 feet while in flight.

Flying above a right-of-way, a pilot can vary spray swath from a maximum of 50 ft. to a minimum of 25 ft. Cockpit controls also allow the pilot to vary volume between 5 and 10 gals. per acre.

The system, for treatment on utility rights-of-way, was developed for use with Tordon herbicide formulations. Dow research and development men said a limited number of the new helicopter units will be used this year by approved applicators as part of a continuing field development program.

Instead of a spray boom, four spray nozzles mounted under the helicopter nose dispense herbicide. Each nozzle can be adjusted 45 degrees in flight. For safer operation, nozzles extend only slightly beyond the toes of the helicopter landing skid. Spray tanks centrally located in line with the helicopter main rotor mast contribute to balance and center-of-gravity values of the helicopter.

Dow engineers say more than 8 years of experiments with various types of equipment preceded this spring's limited commercial introduction. More information on the new spray system can be obtained by writing Bioproducts Div., The Dow Chemical Co., Box 512, Midland, Mich. 48641.

Trimming

Historic elm lost. University of Washington's historic 67-year-old Washington elm in front of Lewis Hall has become a victim of Dutch Elm disease. It was a direct descendant of the tree under which George Washington stood to take command of the continental Army in 1775. The original tree on the Harvard University campus died in 1923 at an estimated age of 200 years. Original cutting for the University of Washington elm was taken in 1899 by Arthur F. Collins, a Harvard graduate student. It was taken west for planting three years later. On the bright side, cuttings have been made from the UW elm and tradition will be served by placing one scion in a prominent position on campus. Interesting sidelight is that Harvard secured a clipping from the UW elm for its campus when its original elm died more than 30 years ago. Previously a scion from the UW tree was planted at the nation's capitol at Washington, D. C. Cordwood from the old elm has gone for use at UW residence halls and to the UW College of Forestry for research. Decision to remove the tree was made by Prof. Charles Driver, UW department of forest pathology, Prof. Richard Walker, Chairman of the UW botany department, Eric Hoyte, landscape architect, and Brian Mulligan, Arboretum director, after the 75-foot giant was first damaged by lightning in 1963 and then became infected with fungi spores.

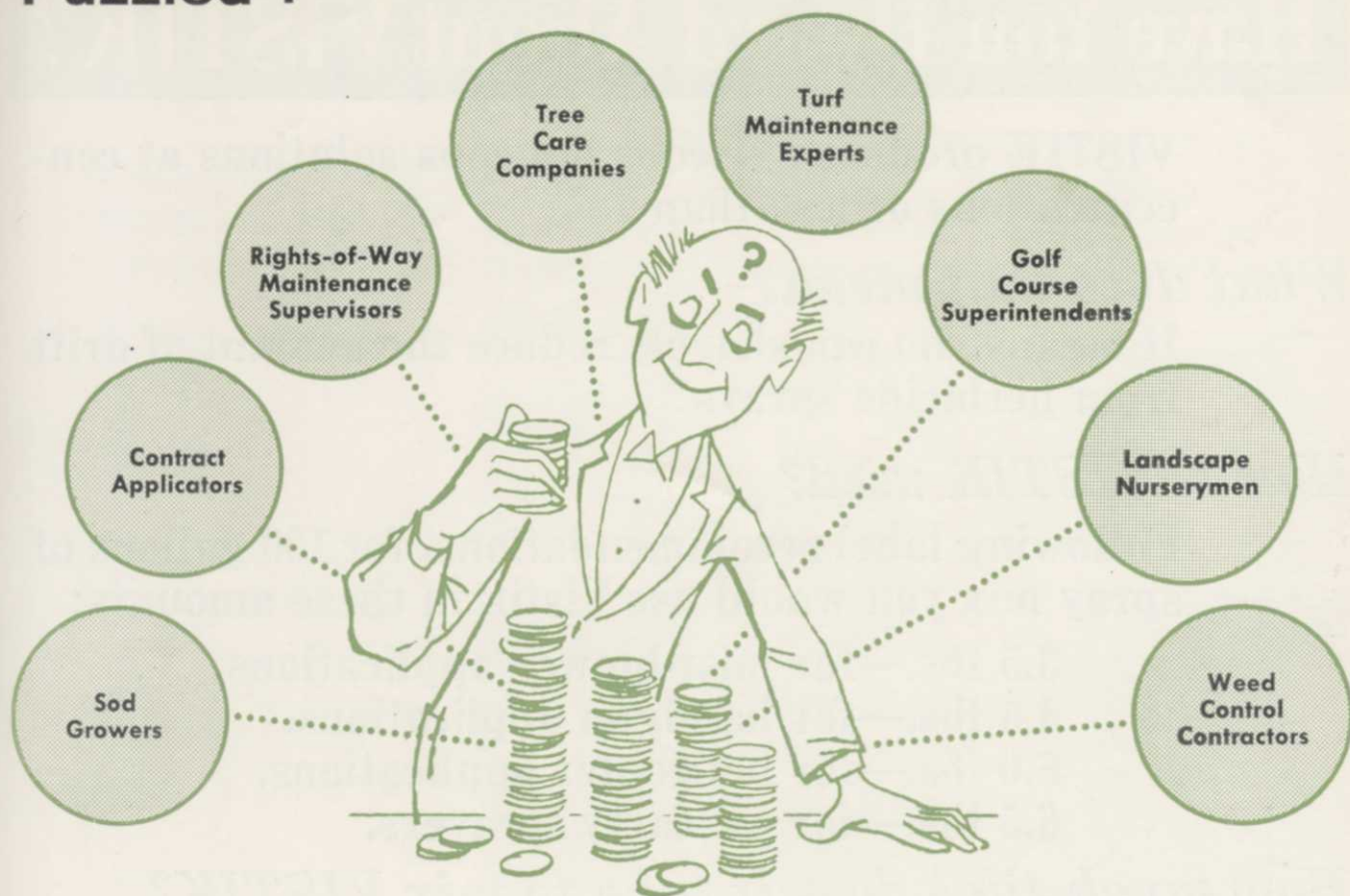
* * *

Peat-Based Lawns. Why not here? Hungarofruct, a Hungarian trade group, is exporting to Austria sod grown on plastic covers on a peat base. Peat is laid down on plastic covers and seeded, followed by plentiful watering. Within two months, a smooth grass lawn is said to be ready for tying roadbanks or embankments, grassing parks, embellishing gardens, turfing groves and for use in cemeteries. The peat base is easy to cut into any shape desired. Costs are somewhat higher than with production of conventional sods but the same area can be used three times per season. Sod is reported to take root very quickly.

* * *

Tax break for saving trees? We like Harry J. Banker's thinking regarding Iowa Senator Jack Miller's bill S 3776. Senator Miller's bill would permit a tax reduction for expenses incurred for work to prevent the destruction of trees infected or infested with diseases or insects. Banker, president of the New Jersey Society of Certified Tree Experts, believes care and maintenance of trees on private property is vitally necessary in every community of the United States if residential areas are to retain their pleasing character and not be permitted to slowly degenerate into slums. Tangible financial relief from this particular maintenance expense can go a long way in helping maintain more than just a minimum tree population in our cities.

Puzzled ?



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If you manufacture or distribute equipment, herbicides, fungicides, insecticides, or any other product used in the multibillion dollar vegetation maintenance and control field, there is no more direct way to reach your customers and prospects than through the advertising pages of WEEDS TREES AND TURF. There's no waste circulation. WTT goes directly to the major buyers of these products in all the 50 states. It's read by contract applicators; tree service experts; landscape nurserymen; aerial applicators; golf course superintendents; supervisors for rights-of-way with highway departments, railways, utilities; those re-

sponsible for state and county weed and brush control, turf management and tree service; superintendents of large grounds (estates, industrial parks, military establishments, cemeteries, etc.); and the nation's prosperous sod growers. These buyers and users subscribe to *this*, their how-to-do-it, where-to-buy-it magazine, now in its 6th year, because WTT talks their language. Your advertising dollars sell harder and go farther in WEEDS TREES AND TURF. If you'd like full details, write us today and we'll send you one of our information-packed Market Fact Files by return mail.

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Any more questions?



HERCULES

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