WEEDS TREES and TURF

A TRADE MAGAZINES PUBLICATION

May 1967

Highway Maintenance Programs

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Aquatic Weed Control Is Technical Operation

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Mark of Tree Industry Is Professional Tree Care

Page 21

Cargo capacity of 1400 pounds and amphibious capabilities make Swamp Spryte with Myers sprayer essential equipment in treatment of shallow, swampy areas in New Jersey. See article on pg. 16.

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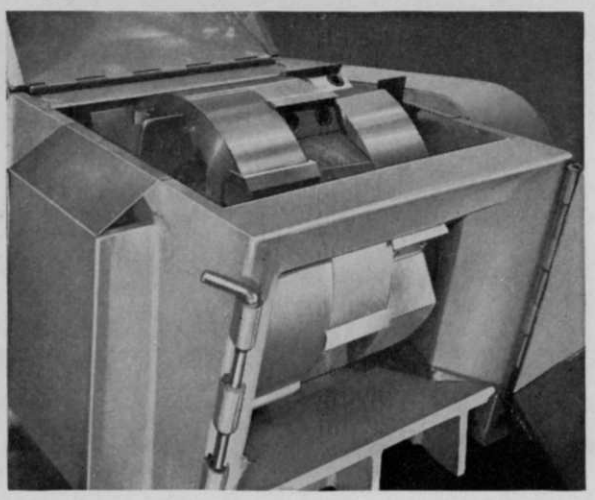

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Herbicide Industry Needs Career Man

Chemical weed control has become an essential phase of management in the industry. Not only is it important in those businesses associated with weeds, trees and turf but is even more so in the worldwide picture for production of food and fiber.

Seldom has an industry enjoyed the rapid expansion experienced by herbicides in research, manufacturing, sales, and use. Results to date are plus.

But with this sudden and profitable growth has come a critical shortage of trained professionals to serve the industry. Competition for personnel is the in thing in the industry. Because of the complexity of the field, and the requirement for scientific minds, men to fill the voids today do not exist.

Generally, too few personnel have been assigned by universities in teaching and research fields to do the job. Too few have been encouraged by industry to prepare for this specific field. Difficulty in testing and registering new products demonstrates government's lack of trained men and facilities. Shortages of men today are critical to the point that expansion rates of some companies are being hampered.

Naturally, the industrywide answer calls for more than a simple resolution by various organizations associated with herbicide research, development, or use. Nor can the overall problem be solved within a few months, or even years.

Since the obvious solution is trained manpower, the entire industry needs to contribute both to recruitment and training.

Dr. William R. Furtick, agronomist at Oregon State University, Corvallis, put it most succinctly at the recent national conference of the Weed Society of America. He called for recognition by university administrations of the critical needs of the field and the responsibility of members of the industry for bringing about this recognition. He believes effective educational programs are needed at the high school level to demonstrate the challenges of the field. Likewise undergraduate college students must be made acquainted with the opportunities of the field. And finally, Dr. Furtick believes universities, industries and government agencies must work together in solving the training program. He feels that many capable scientists now in industry and government could join their university co-workers in serving on graduate student committees and with special problems and facilities in maximizing the training potential. WTT not only agrees but feels such steps are mandatory.

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

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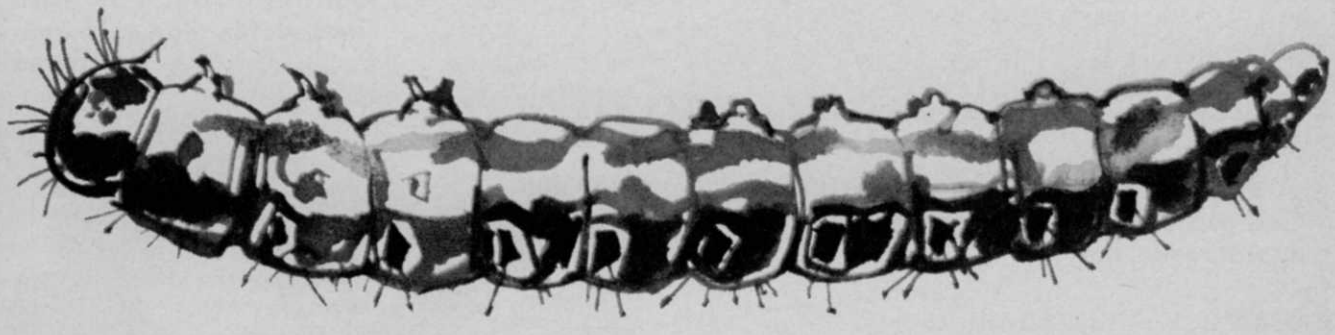

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Highway Maintenance

Editor's Note: Recognizing that highway maintenance problems are complex and varied in the industry WTT will from time to time carry experiences of how states in various parts of the nation are approaching the tasks of economically and efficiently keeping their highways safe and beautiful. Reports in this issue are made with the help of the Kentucky Division of Roadside Development and the Massachusetts Department of Public Works.

Phase I. Task-Force Initiate

A midwestern state reports on organizing and planning for chemical weed control on a statewide basis.

KENTUCKY has turned to chemical spraying for highway weed control. The Department of Highways through its Division of Roadside Development has initiated a carefully planned operation for the entire state. Results after the first year spell success.

In a special report to WTT, J. M. Phillips, director of Public Affairs for Kentucky's highway department, credits widespread support for initial progress.

Kentucky's highway department expected some questions regarding an all-out spray program. But recognizing that it had a job to do, the decision to spray was made and a careful step-by-step approach adopted. Management and details of initiating the program were turned over to the Division of Roadside Development.

Spray rig safety devices are important in Kentucky's highway equipment. Note mask over face to protect against drifting materials, communication system which keeps operator in touch with driver, and mandatory seat belt. Operator is Wilber Sheriff of state's special spray crew.

Special crew training for Kentucky involved bringing key men from 12 state districts to central office during the season as need indicated. Division of Roadside Development found central training sessions provided opportunity for foremen and others to trade experiences gained as program progressed.

A firm policy for program control was established. Simply stated, it was that any management of roadside vegetation should be done by using the safest, most effective, and economical method. Where chemical weed and brush control met requirements, these would be used. Indiscriminate spraying would not be tolerated.

To insure that this policy would be carried out, Chief Agronomist Jim Griffin, under the direction of K. C. Arnold, head of the Division, was named to guide the chemical phase of

(Continued on page 10)

Multiphased Management Task Faced By Our 50 States

Phase II, Project Utility

An eastern state reports on highway maintenance aimed at both safety and beauty.

MASSACHUSETTS ties safety and beauty together in a practical approach to highway roadside development.

In reporting on the Bay State program, Joseph L. Beasley, highway landscape supervisor for the Department of Public Works, states that new visionary thinking and new approaches in roadside development can enable the industry to conceive and prepare roadsides for future generations.

Highways, Beasley says, are wide corridors passing through our countryside. After many years of practical experience in the field and dozens of completed projects, he feels that prior to, and after highway development, there is a need for adequate land acquisition in order to fully protect this corridor. Proper development will then improve this corridor.

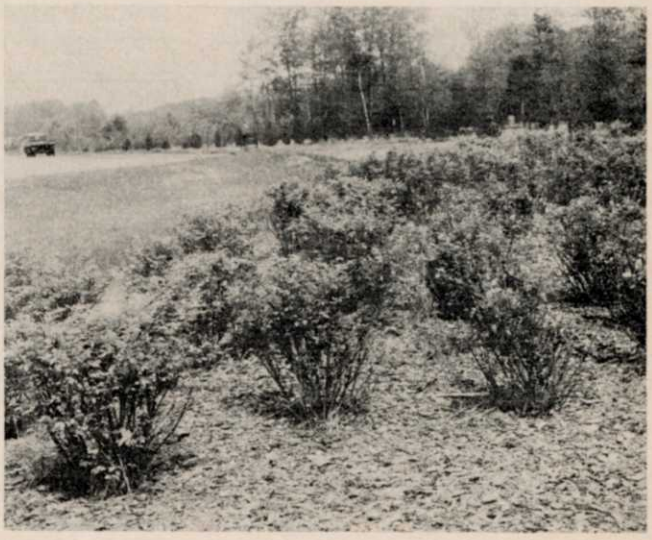
Beasley does not believe that trees can be planted just for the sake of planting trees. In Massachusetts, there is a reason and need for every tree, shrub or yard of mulch used. Though it may appear that larger than necessary quantities of planting materials are being used in the Bay State program, he points out that the amount is only 30% of the total needed to replace the areas stripped of plants and trees during construction of new highways.

One goal of the program, which is in line with President Lyndon Johnson's beautification program, is to salvage all remnants of land left after a highway has been constructed. Both those pieces of land in urban and rural areas are used as small parks or planted with trees or shrubs for posterity. Emphasis in urban areas is for more large-scale landscaping, including greater scope and use of larger plant material.

Roadsides on urban sections of the Interstate System are usually narrow. This limits possibilities in development. Careful study and use of specialized plant material is needed to develop them. Each stretch of highway and each interchange presents an individual problem. Many times plant-

(Continued on page 11)

Example of formal planting in the Massachusetts program is this interchange located at intersection of Routes 128 and 37 near Braintree. Joseph L. Beasley, Department of Public Works, reports that bridge abutments, including bed plantings and individual trees are mulched with 3 inches of wood chips.



Roadside rest area near Swansea on Route 195 contains successful planting with wood chip mulch. Massachusetts plan calls for giving prime consideration to shade trees in such areas. Note evergreens and natural growth in background.

Kentucky Program
(from page 8)

turf management. Assisted by regional agronomists, he worked closely with spray crews.

Foremen and special crews were selected and trained via special field days. First choice for spray crew foremen, one for each of the 12 state highway districts, were foremen of existing special crews, since they knew local highways, residents and terrain. Where such men were not available, prospects were carefully screened. Foremen, in turn and with the help of agronomists, selected members of their crews.

Intensive Training At All Levels

Intensive training was given foremen in a 5-day program at the central office. Department agronomists with the help of technical consultants schooled leaders in every aspect of the new Kentucky program. Foremen were prepared to drill crews on procedures and in use of equipment on return to their districts. One phase of the policy was that no application of spray materials be made until crew members understood the necessary methods and procedure.

Foremen were further charged with the task of deciding what spraying needed to be done in their own districts. With their crews, and accompanied by an agronomist, they covered every mile of highway right-of-way in their districts. Purpose of this phase of the program was to spot the type weeds and brush, where located, and control for each. Logbooks were compiled as they proceeded. These logbooks then became a work plan, plus becoming the basis for a proposed budget to finance the coming year's work.

A by-product of this mile-by-mile inspection of the rights-of-way was job appreciation. Foremen and crews alike developed an awareness of the importance of the program and how it would contribute to the safety and beauty of Kentucky's highway system. This background and training proved to be vital in success of the program. Men who would do the work were made to realize that changing weather creates limitations on spraying, that seasonal effects and growth habits of plants must be understood. A work plan laid out a year in advance and based on familiarity with the areas to be treated aided foremen and crews in applying their new and first-hand knowledge.

For example, weed and brush control was to be handled in such a way that it would contribute to highway appearance, and certainly not detract. Indiscriminate spraying to kill tall brush would not meet this criteria. Thus a rule was developed that no plant more than 3 feet tall would be sprayed while in leaf. Procedure was to cut and then treat the stump. Tall brush could be sprayed while dormant, then removed the next season.

Suitable Equipment A Part of Plan

During the period when crews were being picked and trained, selection of suitable equipment demanded attention. Safety to operators and protection of desirable plants in areas to be sprayed were factors. Equipment was purchased which would deliver high volume at low pressure, to insure large droplets so nozzled as to provide careful control of spray pattern. The new equipment also included a seat mounted at the rear of the spray boom which would provide the operator with visual control of the spray. An intercom connection with the truck driver provided an extra margin of safety. Equipment was also selected for adequate capacity, simple design, and rugged construction. Safety belts for operators were musts. Spray trucks were lighted and marked for safety.

Climate and farm areas in Kentucky require chemical formulations of low volatility. To keep the program simple and manageable, materials which were useful for both foliage and dormant treatment were sought. Specifications along these lines were written and bids were asked from suppliers. Successful bidders were asked to maintain a close working relationship in areas where their products were being used.

As the program began to develop, foremen and agronomists were each asked to begin compiling a handbook. Into these handbooks went operational memoranda, informational materials from the industry, sprayer calibrations, legal guidance and records.

Major evaluation of the entire program was made at the end of the year. Each foreman was asked to evaluate his own work area and all foremen brought together to exchange ideas, information and experiences. Overall results are encouraging and Department thinking is to enlarge and improve the program, at the same time maintaining current policies and procedures. Public acceptance is indicated by the rarity of complaints during the past year.

A major aspect which will continue is allowing for the natural revegetation of native plants in areas where such is desirable and fitting. This type approach is not only saving maintenance dollars but is helping new highways to become more a part of the natural landscape.

Steps In the Kentucky Highway Maintenance Plan

1. Recognition and study of the problem.
2. Assignment of an agronomist to guide chemical use.
3. Careful selection of a crew foreman for each district.
4. Intensive training of foremen.
5. Handpicking and training of crews.
6. Equipment selection and procurement.
7. Determining specific problem areas by district and development of logbooks.
8. Setting up work schedules one year in advance.
9. Compiling of handbooks by foremen and agronomists during course of the year.
10. Evaluation meeting at end of year and policy determination by Department.

Massachusetts Program
(from page 9)

ings are advantageous. In other cases they are hazards creating blind, accident-prone areas.

The Massachusetts program also calls for making maximum use of local, natural growth in the area. Natural growth is not a cure-all, but does have a prominent place in roadside design along with turf and the more sophisticated plantings.

Turf Established
Minimum of 30 feet

Grass is planted for a distance of 30 feet on both sides of all roadways in the state. This produces the necessary sight distance for safety. It also prevents the roadway being shaded and helps in snow and ice control operations. Tree hazards close to road surfaces are also eliminated. Open turf areas on each side of the highway give the feeling of ample width so that motorists make full use of travel lanes. Beasley points out, however, that the 30-foot distance on each side of the roadbed is only a starting point. Fill slopes with guardrails are never planted to grass, but to some low-growing natural growth cover. Turf should never be seeded or laid on cut slopes beyond a point five feet from the toe of the slope, or at a distance greater than can be reached by the cutterbar of a tractor mower. Turf many times is used effectively at distances much greater than 30 feet, usually on fairly level areas. In short, the back line of the turf is not maintained as a straight line parallel with the road surface, but is varied from place to place.

Beyond this turf back line, to the outer limits disturbed by construction, first consideration is in replacing the type of natural growth removed. For example, if pine growth has been removed, the area is designed for use of woody mulch and pine seedlings, spaced about 5 feet on centers. If all survive, salvage thinning is done at a later date.

Plantings such as these increase in value and the roadsides improve in appearance each year. Turf areas are more apt to decline as the years pass.

Beasley's recommendations for planting based on the Massachusetts system call for mass planting of trees and shrubs. Various plantings are drifted into one another. Trees are planted in groves, groups, or clumps to present a natural appearance. Following are what he considers satisfactory locations for planting:

1. Plant as near as possible to location line.
2. On highways with wide layout groups of growing trees, plant halfway between shoulder and location line with taller growing shade trees and evergreens planted in back of or between these groups and the location line.
3. In bowl areas at interchanges, trees are not planted less than 35 feet from the ramp road and not less than 15 feet outside the toe of the slope, so that they will not interfere with sight distance or mowing.
4. Trees are planted and grouped in such a manner that they cause minimum interference with mowing equipment or other maintenance operations and overhead utility lines.
5. Evergreens are planted in checkerboard fashion on abutment slopes and on the fill slopes of interchanges.
6. Trees set out in groups consist of 3 to 5, 7, or 15 of the same species. At interchanges or wide layout areas, 15 or 20 in a group is common.
7. Willow trees are used only in moist locations and far enough back within the layout to allow for their size at full maturity.
8. Gravel pits, dumps, maintenance areas and other such views are screened with evergreens.
9. Unsightly areas which are difficult to mow and not practical to grade and seed are planted with groups of trees or evergreens.
10. Planting of trees at roadside rest areas for shading are given prime consideration.

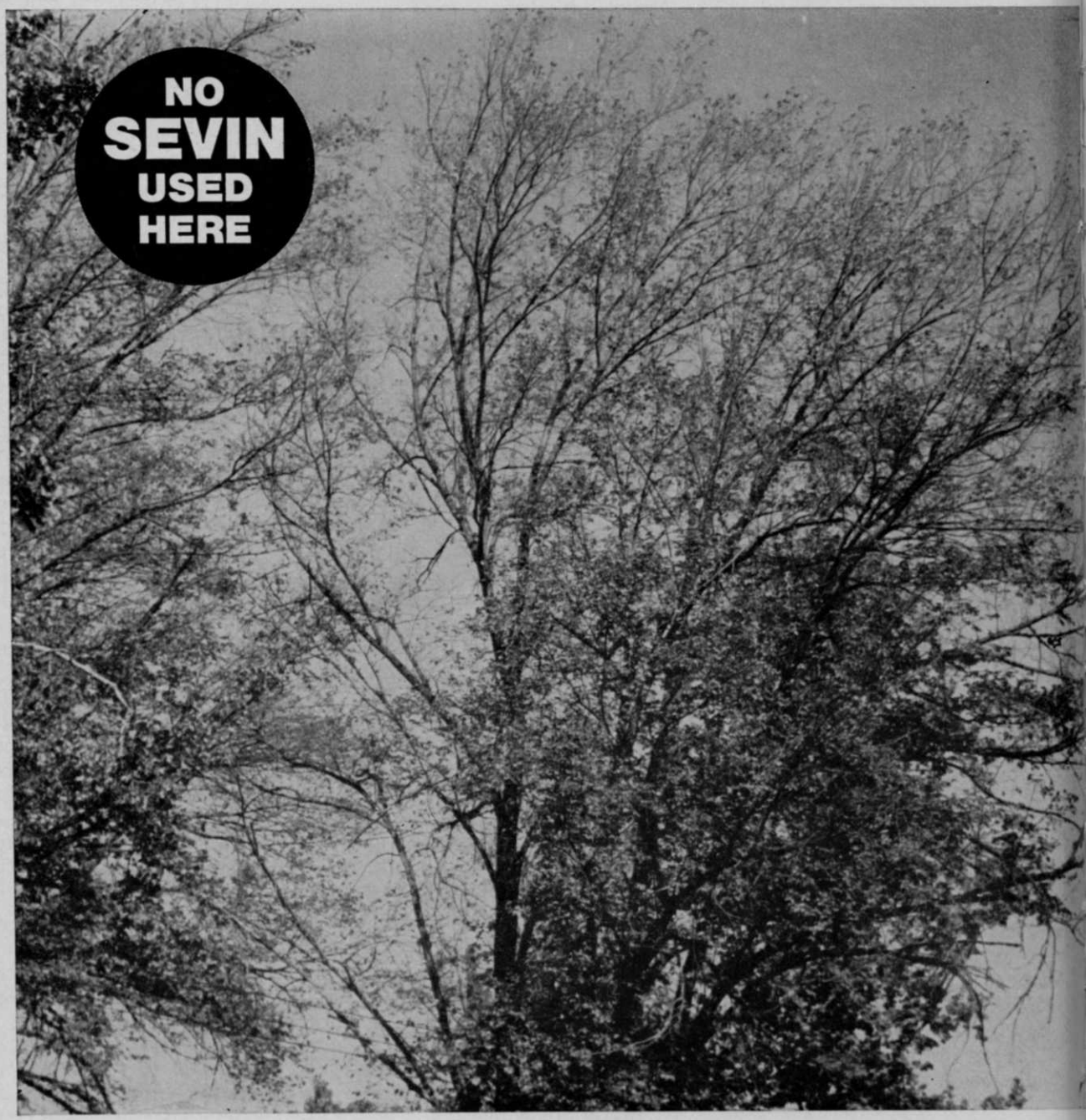
Unsatisfactory locations of tree plantings are important, too, in design and planning. Unsatisfactory spots listed by Beasley are: Under utility wires unless the specie is low growing; in grassed areas between curbing and sidewalk; on the inside of curves where sight distance would be decreased appreciably; in areas close to street intersections at grade or at drives where sight distance would be decreased; less than 12 feet from edge of shoulder on narrow layout highways and less than 35 feet on wide layout or limited access highways; in straight rows or at set distances; in median strips less than 30 feet in width; in open areas within the layout where there is already a suitable background of trees and shrubbery; in dividing strips of ramps; in front of attractive bridge abutments; and where planting may screen vistas or picturesque scenery.

By way of summary, Beasley believes that better roadside turf management can help solve maintenance problems. Further, it is the responsibility of the industry, he feels, to leave a heritage of green and beautiful roadsides for future generations to enjoy.

Massachusetts Plan For Safety and Beauty

1. Recognize that highways are a corridor passing through our countryside—to be improved and protected—for safety and beauty, and for future generations.
2. Salvage construction remnants of land—for small parks or tree plantings.
3. Treat each stretch of highway and each interchange as an individual project.
4. Make maximum use of natural growth in area.
5. Grass first 30 feet alongside highway for safety (and vary the backline of grass).
6. Maintain an awareness that a beautiful highway is a safe highway.
7. Plan planting locations carefully.
8. Continue to develop the policy that careful management helps solve maintenance problems.

The difference is

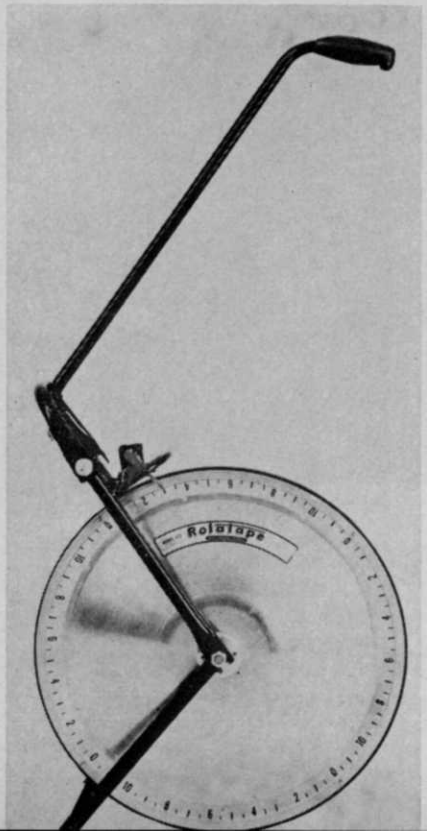


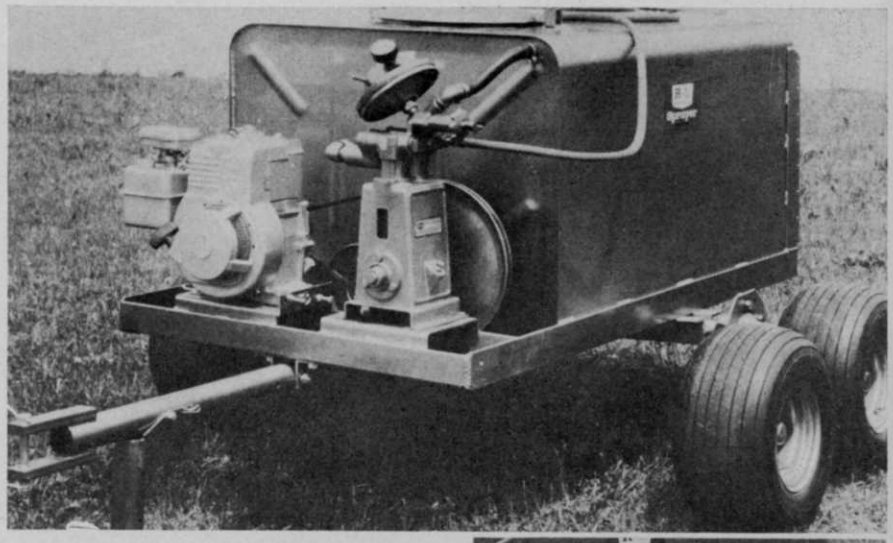
Elm leaf beetles ruined the foliage and damaged the growth of the elm tree, shown above, where no SEVIN was used. But where SEVIN carbaryl insecticide was used to protect the foliage, as shown on the opposite page, the tree stayed healthy, damage-free and attractive. SEVIN provides long-lasting and effective control of major insect pests of trees shrubs, flowers and turf. SEVIN is safer to handl than many other insecticides and its lower toxicit to animals and wild life makes it a wise choice fo insect control on ornamental plantings. For bette insect control, remember ***the difference is SEVIN***

Panorama New Turf Maintenance Equipment

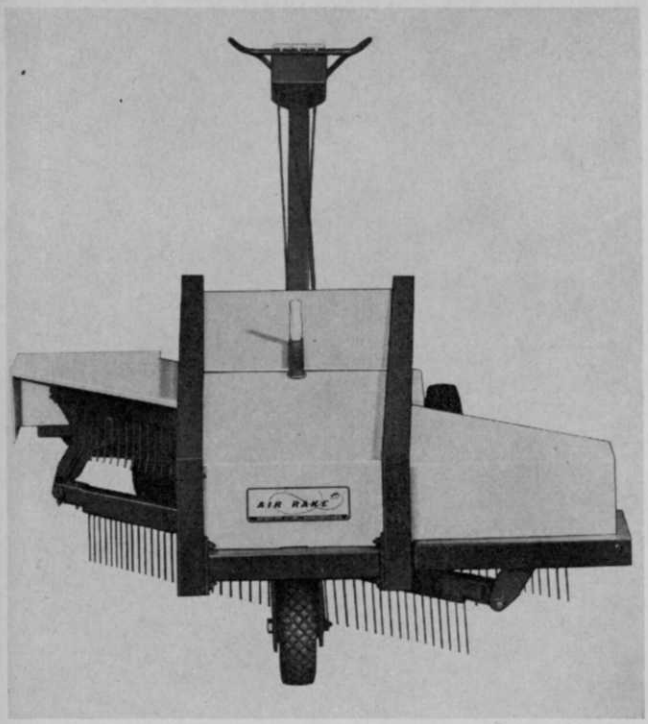
New Turf-Spray attachment for fast and effective spraying of lawns and other ground surfaces has been developed by H. D. Hudson Manufacturing Co. It is designed exclusively for use with the Hudson "Trail-N-Spray" 12½-gallon power sprayer drawn by yard tractors. The attachment has a single broad spray nozzle which sprays weed and crabgrass killers or liquid fertilizers in an even pattern. It is adjustable to spray a swath from 25 inches to 65 inches wide. A flow control lever, operated by the driver, is positioned directly behind the tractor seat. Although the Turf-Spray attachment is easily attached and removed, it may be kept on the sprayer when the operator is using a spray gun. The sprayer can be used with all makes of yard tractors and riding mowers. It is available through authorized Hudson lawn and garden and implement dealers. For further details, write H. D. Hudson Manufacturing Company, 589 E. Illinois St., Chicago, Ill.

Rolatape measuring wheel, below, for uneven terrain is Model 415 from Rolatape Corp., 1301 Olympic Blvd., Santa Monica, Calif. Plated steel disc wheel prevents tall grass or other refuse from interfering with accuracy. Distances to 100,000 feet recorded automatically. Handle folds for transport. Circumference is 4 feet. Weight, 9 pounds. Automatic brake prevents backtracking.

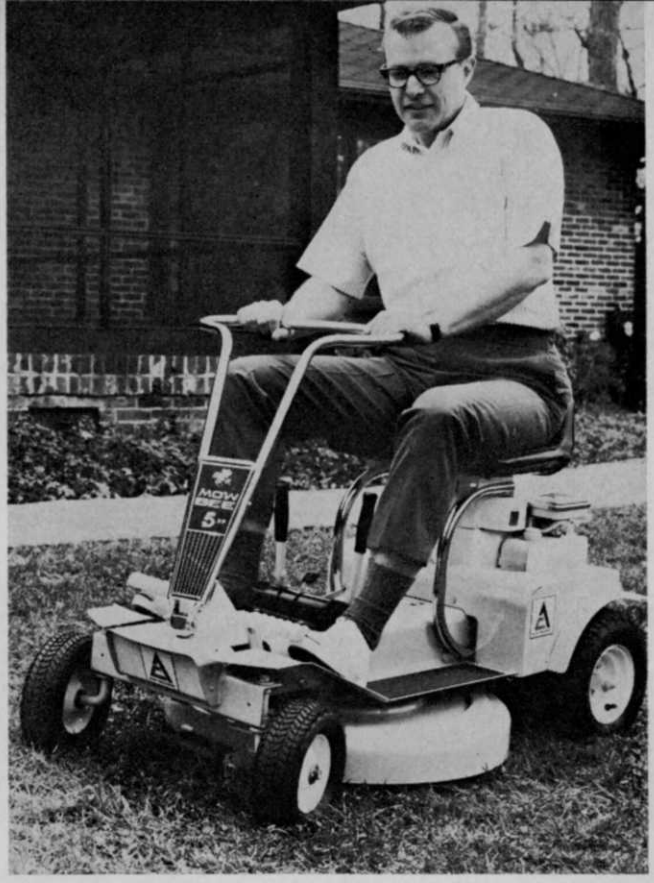




Tire conversion set, above and right, for heavy-duty sprayers in turf maintenance, has been introduced by Root-Lowell Corp. Termed the Turf-Saver Wheel Set No. 1409, it replaces standard wheels and tires when possibility of turf damage exists. Mounting is done with auto bumper jack. Frame bolts direct to axle hub. Two low-pressure tires on each side give wide, soft weight distribution and "floating" action over irregular ground contours. Set consists of 4 wheels with 9:50 x 8 tires and tubes in tandem. Outside diameter is 18 inches. Write Root-Lowell Corp., Dept. WS, Lowell, Mich.



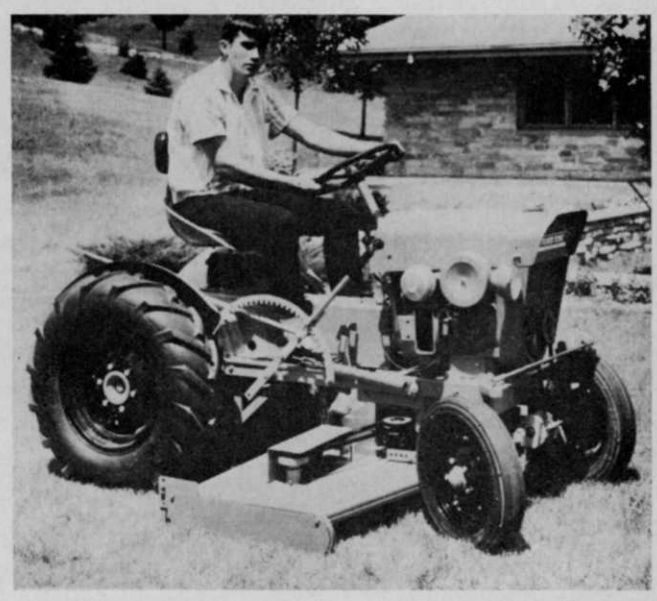
Whirly Rake by Air Rake Manufacturing Co., 41 Jefferson St., Westfield, Mass., patterned after side-delivery rake windrows material. Three comb or rake arms are fitted with wire tines, attached to a rotating hub which drives rake arms in circular motion. Wire tines cover 3-foot surface frontage. Loom-type action rakes leaves, pine needles, acorns, grass clippings and other refuse. Action adjustable for deep down thatching. Available motorized or as pull unit for riding mowers or compact tractors.



New from Allis-Chalmers, Milwaukee, Wis., is versatile, 5-hp MOW-BEE riding mower, above. Powered by 4-cycle Briggs & Stratton vertical shaft engine with spring recoil starter. Five ground speeds, reverse, and on-the-go shifting without clutching. Overall length, 52 inches, width 31¾ inches. Turning radius 32 inches. Five cutting heights, 1½-3½ inches. Automatic brake when drive is disengaged. Grouped control console and swing-away steering tiller.

Self-contained power sprayer with 10- or 20-gallon porcelainized steel tank, above, from John Bean. For weeds, pests and mosquito-infested areas. Trojan sprays 3 gallons per minute at 60 pounds pressure. Self-lubricating, fiberglass pump, located inside tank, has only one moving part. Jet agitation and constant spray pattern. Catalog, S-03, John Bean Div., Tipton, Ind.

Economy tractor, below, handles rotary mowers up to 60 inches. Mows 3 acres per hour. Cutting height adjustment, foot operated clutch for disengaging cutting knives, lift mechanism for raising during travel, heavy cover, and sheave guards. Tractor has 12-hp engine, automotive drive train, welded frame, 16- and 24-inch wheels. Also handles 4-foot dozer blade, ¼-ton front end loader, 36- and 48-inch snow blowers and implements. Write Engineering Products Co., 1005-HF, Anoka Ave., Waukesha, Wis.



Aquatic Weed Control Becomes Technical Operation

Truesdale Lake, N. Y., is one of many lakes cleared of aquatic weeds by Robert E. Sheridan and Sons, Inc. Beginning about 1950, this corporation was established and has worked primarily with northern New Jersey lakes. Excellent results were obtained on Truesdale Lake by use of 2,4,5-T and copper sulfate for weed and algae control.

This special report on aquatic weed control by a leading contractor on the eastern seaboard was prepared for WTT by Douglas G. Bennett, Phelps Dodge Refining Corporation. It is an excellent example of the scientific and technical knowledge and experience needed to serve this field.

EXTENSIVE growth of duckweed in the water adjoining a home, David J. Sheridan says, usually indicates a leaky septic tank in the vicinity. Sheridan, partner with Warner G. Johnson of Robert E. Sheridan and Sons, Inc., Dover, New Jersey, specialists in aquatic weed control, finds himself with so much work both in New Jersey and nearby states that he says, "It's hard to believe that as late as 1950, many northern New Jersey lakes were comparatively clear of aquatic vegetation." However, as lakeside colonies sprang up, wastes poured into lake water, fish populations were depleted, nature's balance was upset and water weeds took over.

In 1950, Sheridan's father, Robert E. Sheridan, Sr., recognizing an increasing need for aquatic weed control, established the company and began working out the aquatic weed control methods which are proving successful in New Jersey and neighboring states.

With a careful study and analysis of problems, Sheridan has constantly refined his methods. He was first to undertake commercial application of the then new aquatic weed control agent, 2,4,5-T, in New Jersey. Previously the Sheridans had excellent results with this chemical on Truesdale Lake in New York State. Use of air boats to apply copper sulfate for algae control is another Sheridan inspiration. Robert E. Sheridan and Sons, Inc., works on most of the major lakes in New Jersey, as well as on bodies of water in neighboring states, operating on the basis of seasonal contracts.

Careful Study Precedes Treatment

Before embarking on the actual work of weed eradication, the firm makes a complete and comprehensive study of the lake to be treated. This includes analysis of water samples taken from a number of locations and depths in the lake, water temperatures, soundings to plot a contour of the lake bottom, samples of the weeds to be destroyed, and current flow. All of these factors are necessary in order to plan correct treatment procedures. Sheridan says, "What will work for one lake will not necessarily be successful on another even though they may be adjoining." These studies also serve as a basis for Sheridan to explain causes of weed growth to clients.

Most privately owned or state-controlled lake communities require septic tanks of approved design and good condition. However, faulty construction or ground movement due to frost or settling sometimes causes leaks in a system. Sewage can then seep underground into a lake where the released nutrients nourish a crop of undesirable weeds. Sheridan has noted over the years that an extensive growth of duckweed in the water adjoining a home is a strong indication that sewage is leaking into the lake. Sheridan explains such a situation to the property owner, giving the owner an opportunity to take corrective

measures, thus cutting down the nutrient level of the water and the incidence of weed propagation.

Sheridan cites two examples why more and more lakes are experiencing weed problems. One is White Lake in New Jersey. When this private lake was developed in 1940, water was clear and free of weeds and algae. As homesites surrounding the lake were developed and occupied, nutrient content of the water rose because more sewage found its way into the lake. Resulting weed growth over the years then impaired use of the lake for swimming, boating, and fishing. Since value of lakeside property is directly in proportion to use of the water and esthetic values of scenic beauty, unsightly and odoriferous weeds which restrict activities on the lake tend to reduce property values. This is a strong incentive for the governing bodies of lake communities to take corrective action. Another reason for the rising incidence of weed growth is increasing popularity of outboard motor boats.

"Boats play an important role in infecting lakes with weeds by spreading the seeds," says Dave Sheridan. "People used to keep their boats on the lake where they had their homes. Now, with the ease of loading on trailers, many people who do not live near the water own boats and haul them to whatever lake they desire. Weed seeds are transported from lake to lake in this manner since they will adhere to the hull, even though the boat is dried out between weekends. Thus, in the course of one season, a large number of lakes can be infected."

Equipment Must Fit the Job

Once the initial survey work is completed and the company receives the go-ahead, equipment is moved onto the lake and treatment started. Because physical conditions and requirements vary from job to job, today's applicator must not only have standard boats, tanks, and pumps at his disposal, but also must be adept at designing and constructing special chemical-dispensing equipment that may be required to meet unique situations. Sheridan uses any one of three air boats of 100, 103 and 125 hp with varying capacities, as dictated by the density of the weeds, depth of the lake, and the amount of material to be carried. He has found that with the variety of chemicals used, a mixing tank of Type 316 stainless steel and brass boom jets are the most satisfactory.

Sheridan's initial use of air boats was a result of a contract to treat the lakes at the New York World's Fair in 1963 and '64. The lakes, situated within the exhibition area, were subject to extensive, unsightly growths of weeds and algae. Because these lakes were shallow (four to six feet) and had a soft layer of sediment on the bottom, use of an outboard-driven boat to dispense copper sulfate was impractical. Test runs had shown that the outboard caused underwater turbulence to the point that the copper sulfate was being absorbed into the sediment instead of going into solution with sufficient residual to destroy the algae.

Other problems specific to these lakes were also encountered:

1. Because considerable amounts of nutrients necessitated frequent applications, equipment had to have a great deal of mobility.

2. Dependability and mobility were essential because of limited application time available. Since the Fair opened to the public at 10 a.m. daily, application had to be concluded by then. Thus, a system capable of efficient use of available time, with the potential of counteracting any extenuating circumstance, had to be provided.

3. Due to the ease with which bottom sediment was disturbed, some method of propulsion, eliminating turbulence, had to be worked out. At the same time, the shallow depth required the elimination of any projection below the boat.

4. Turbulence would also decrease the residual copper after application, since the copper sulfate would tie up with this agitated material, reducing the action on the algae and necessitating increased dosages to arrive at desired results.

5. As a result of the increased dosage required, the problem of providing adequate protection of the fish population arose.

6. The last major factor involved was the unusually high alkalinity found in the World's Fair lakes which compounded the dosage problem.

After considerable study of the situation, and based upon

Lake, right, is typical of many in area served by Sheridan corporation. Algae and weed problems are carefully studied prior to treatment. Treatments to solve specific problems may vary even though lakes are located in adjoining areas.

previous experience, Sheridan decided on the use of an air boat as the most practical means of applying copper sulfate as an algaecide. The following results substantiated this decision:

1. Mobility was solved by providing a system that was self-contained, easily transferable and ready for use without extensive preparation. This proved to be the air boat.

2. The time factor was solved by providing a system that allowed for varying speeds, patterns, and solutions. The speed of the air boat can be regulated with a great degree of precision up to 25 miles per hour. The spray pattern, through the use of boom jets, allows a variation in width up to sixty feet with instant control of the pattern on either side of the boat. The chemical solution can be controlled in the mixing tanks by adjusting a simple regulating valve and through the use of a flow meter. The quantity of liquid in the tanks is further regulated by a float valve.

3. Projections extending below the boat and turbulence by underwater propulsion were eliminated through the use of the aircraft motor and propeller.

4. The loss of copper sulfate by absorption into bottom sediment was also solved by removing the source of turbulence; that is, the underwater propulsion.

5. Greater protection was afforded to the fish population because less algaecide was now required to achieve the desired residual of copper in the water. Further protection was provided by applying copper sulfate to the lakes in sections; the first and second sections to be treated being on the opposite ends of the lake.

6. The problem of high alkalinity was solved by recognizing the diurnal characteristics of alkalinity in water and providing for application early in the morning when the pH was still fairly low.

Comparison of Lake Treating Methods

	Old Method	New Method
1. Method of application	standard	spray
2. Propulsion	outboard motor	air motor
3. Agitation of bottom deposits	substantial	minor
4. Pounds of copper applied	14,350	11,300
5. Total cost	$2,858.00	$2,422.00
6. Residual copper after 24 hrs. as CU++, MG/1	(1) 0.83 (2) 0.69	(1) 1.00 (2) 1.08
7. Residual copper after 94 hrs. as CU++, MG/1*	(1) 0.33 (2) 0.21	(1) 0.56 (2) 0.66

*milligrams per liter as copper

The interrelationship of the above factors can be readily seen since the solution of one problem generally facilitated the solution of another. The control provided by this new method can be graphically illustrated by comparing tests in the accompanying table made with the standard procedures and the new method of application on the lakes.

Several important factors may be determined by figures in the preceding table. By using spray application with an air motor, the initial dosage of copper can be decreased while still achieving the same desired result. Therefore, the initial cost of chemical can be much less. Secondly, by eliminating the agitation of bottom sediment, coupled with the spray methods, the residual copper found in the water was greater and persisted at a higher concentration for a longer period of time.

Thus, by providing a flexible system with a new method of application, the major factors preventing normal methods of adequate control were eliminated and increased effectiveness was provided at reduced cost.

An entirely different situation was encountered in treating the lakes on the estate of Doris Duke, Hillsborough, N.J. The

Lakes within exhibition area of recent New York World's Fair were subject to extensive growth of weeds and algae. Sheridan turned to air boats to avoid turbulence in shallow lakes. Copper sulfate was ejected to rear and on both sides of propeller. Spray covered almost 60 feet on each side of unit.

eleven lakes had been designed, as part of the landscaping of the estate, to flow into one another. When Sheridan was called in, the weeds had grown to a point where they were not only unsightly but were clogging the outlets. This prevented free flow of water from lake to lake. Since the lakes were stocked with game fish, extreme care had to be used to insure that chemicals introduced to the upper lakes did not become concentrated in the lower lake to the point of toxicity to fish and other aquatic life. At the same time, the streams connecting the lakes had to be freed of weeds to permit water flow through the entire chain. The program undertaken by Sheridan required 4 years before all the lakes were completely weedless. Once this was the case, periodic treatments have kept the weeds at a minimum and no problems have occurred that required intensified or drastic measures.

The Truesdale Lake was ringed with summer homes and was a popular watering spot until it became choked with weeds. Weed growth virtually ruled out swiming, boating, and fishing. Members of the Truesdale Lake Property Owners Association faced decreasing fun and declining property values. Something had to be done.

Scuba gear for underwater research prior to recommending aquatic weed and algae control are standard procedures. Demonstrating equipment and method, left, is David J. Sheridan.

Necessary arrangements were made with the City and State of New York to treat the lake during the summer of 1961. Since the lake is part of the watershed serving New York City, special arrangements were made to measure chemical concentrations in the water.

This program was conducted under the general supervision of Dr. E. C. Raney, Professor of Fisheries, Biology and Zoology, Cornell University, with assistance from Roy R. Younger, New Jersey Department of Conservation. Sheridan was engaged to undertake the treatment.

A mixture of 2,4,5-T and water was applied as a coarse spray over the surface of the lake. The chemical formed a white emulsion in the water, persisting for about 20 minutes and eliminating the need for marker buoys. This chemical is effective in controlling some of the most obnoxious aquatic weeds when as little as two parts per million are applied in lake water.

The operation produced no adverse effects. Kill of fish was minor. This seems almost inevitable in aquatic vegetation control work since decaying vegetation ties up oxygen in the water. However, 2,4,5-T kills aquatic plants gradually, keeping this problem at a minimum.

Restrictions Common For Municipal Systems

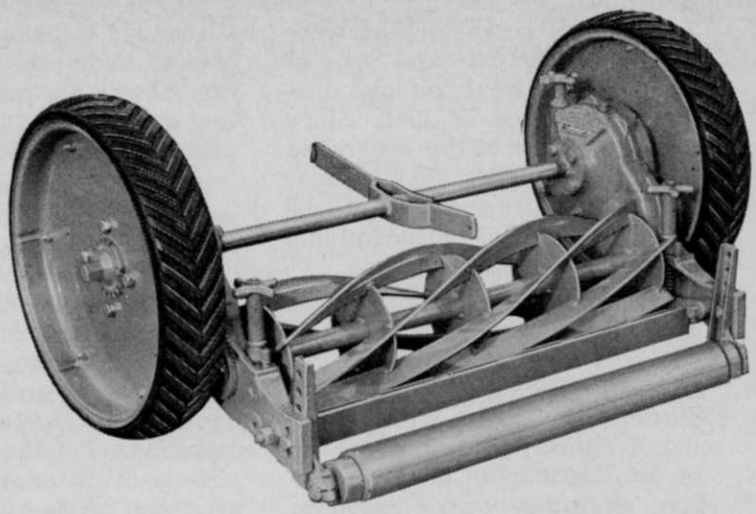
There are many occasions when chemical weed control is restricted in treatment of lakes on the watershed of municipal water systems. Water companies are extremely careful about use of chemicals when there is a possibility that the chemical residual may leach to the reservoir system or be carried into it by streams flowing from lakes in the watershed. When Sheridan encounters such a restriction, sheets of black plastic 100′ x 40′ are spread over the lake bottom and held in place with sandbags. Within 14 days all aquatic growth under the sheet is killed off. Sheets are perforated to allow gases caused by the decomposing weeds to escape.

Algae control is also an important facet of Sheridan's work since decaying weeds following treatment can result in an increase of algae. When the company contracts to treat a section or an entire lake, algae control with copper sulfate is recommended. Obviously the company cannot predict the extent of algae growth nor guarantee against it. As part of their service, Sheridan takes periodic tests of water for algae and also bacteria. If count is on the rise and general conditions are conducive to algae and bacterial growth, Sheridan recommends copper sulfate treatment. "Correct timing is of utmost importance when treating, to maintain a balanced water condition. It's just like the cultivation of roses or any other plant," says partner and biologist, Warner G. Johnson.

Sheridan does its own water analysis and also sends samples to established commercial and state labs for cross-checks. This helps insure correct analyses and also protects the company against claims rising from destruction of fish or any conditions which may have started prior to treatment. Tendency is to blame the applicator and chemicals used, regardless of who or what may be at fault.

In addition to work in aquatic weed control, Robert E. Sheridan and Sons, Inc., applies flocculants such as aluminum sulfate to any body of water where there is a large amount of suspended dirt or mud. Such situations are often the result of heavy rains, floods, or construction work where excavated dirt has been swept or blown into the water.

With the continuing increase and interest in development of lakeside communities and creation of private ponds, Sheridan and other algae and aquatic weed control specialists can look forward to a growing demand for their specialized services.

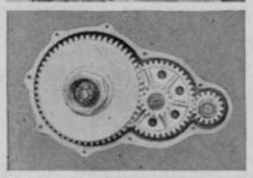


Jacobsen 6-blade Fairway mower. Also available in a high frequency 10-blade model specifically for super fine fairways.

More *Mow*bility features! ...the Jacobsen Fairway Gang Mower

A close examination and comparison of the Jacobsen Fairway mowing unit reveals the reasons for its reputation for superior performance, trouble-free operation and minimum maintenance requirements. These units embody famous Jacobsen features that make Fairway units preferred on fine courses. One-point lubrication requires attention just once a year.

Positive clutch quickly engages and disengages revolving knives with the turn of the knob at the top of each gear housing.



Separate gear drive for each wheel. Both housings contain separate trains of precision, machine-cut gears for better driving efficiency and proper balance. Housings are completely sealed.

Quick adjustment of bed knife is made without tools. A simple turn of the hand knob gives positive adjustment. Friction lock holds adjustment. Bed knife is of special long-wearing alloy hardened steel, with double lip edge.

Every component of the Fairway mower is designed to meet the highest standards of performance, from high frequency of cut to rugged, long-life operation. Why not see it perform, for yourself, on your course? Without obligation, call your distributor for an action demonstration. Jacobsen Manufacturing Company, Racine, Wisconsin.

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Mark of the Industry Today Is Professional Tree Care

Research has helped make a scientific profession of arboriculture. Foresters, entomologists, pathologists, physiologists, arborists and others have contributed to an understanding of tree problems. Their work in the field and laboratory has saved many valuable trees and perpetuated what has now become a national beautification program.

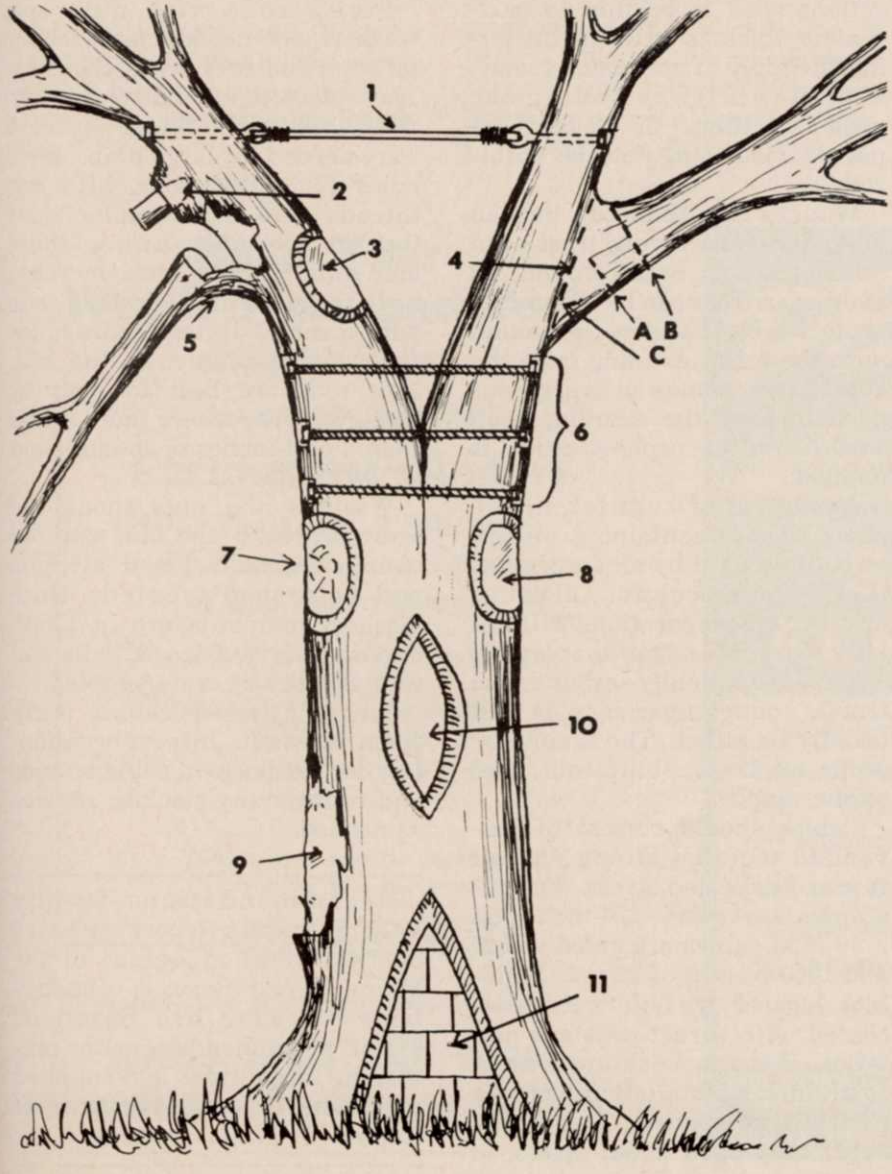
Mechanical care when properly done can speed recovery time for the tree, as well as protect it against insects and diseases during coming months and years. Use of rubber or other soft footwear and ropes are simple practices. But they are extremely important in terms of tree care. Spurs are not nearly so safe as ropes and resulting bark wounds open the tree to disease organisms.

Bleeding at certain times of the year becomes a problem when sapwood is exposed during pruning and cavity work. Maple and birch, which are profuse bleeders, should not be pruned in the spring. Work on other hardwoods and evergreens may be done at any time. Small pruning wounds made between February and May heal most rapidly.

Another precaution in working with trees, especially when moving from site to site, is maintaining sterile tools. Some bacterial, fungus, and virus diseases can be carried by tools. Therefore, use denatured alcohol on all tools after use, or disinfect with bichloride of mercury (very poisonous but may be prepared by mixing 1 part of mercuric chloride to 1000 parts of water), or purchase a commercial disinfectant.

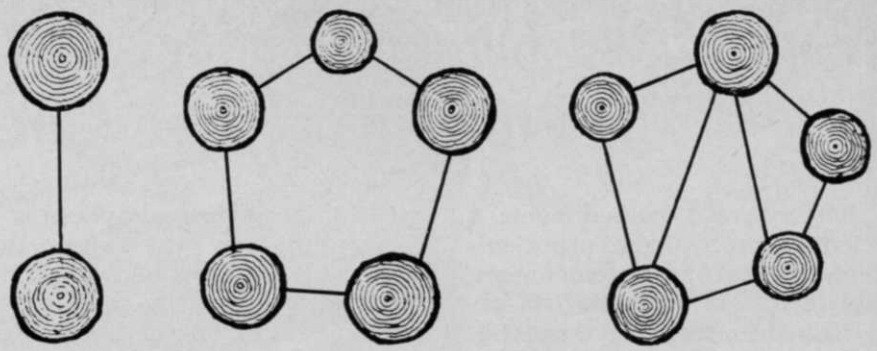
Careful bark tracing promotes rapid healing. Dead or fractured, irregular areas of bark need to be cut back smoothly and cleanly with a sharp knife to live cambium or tight bark. This is true even though the wound is made larger. Cut only soft bark tissues unless wood is decayed. Make the wound lengthwise of the tree, pointed at the top and bottom.

For freshly bruised trunk



1. **Prevent or mend a split crotch** by a cable installed 2/3 of the distance from crotch to top of branches.
2. **Old stub decay** needs to be cut off flush to tree, cavity filled, and treated.
3. **Stub cleaned and treated** as a new wound. Paint exposed bark edges with orange shellac and apply wound dressing.
4. **Any branch more than 1 inch** in diameter needs to be pruned in 3 cuts as lettered, making the center cut first. This prevents damage by peeling of bark.
5. **Stripped bark** results from one-cut pruning or from wind damage. Tree health is aided by keeping bark wounds small and using the 3-cut system in No. 4.
6. **Reinforce weak or split crotches** with screw rods. Counter sink nuts. Bark trace holes and treat.
7. **Perfectly healing pruning wound** should appear as in drawing.
8. **When limb is removed** and only slight decay follows, clean wound and dress, but do not fill.
9. **Common bark injury** or bruise is common. Treat as shown in No. 10.
10. **Treat bruise or bark injury** by cutting torn bark back to solid bark to form a larger wound, pointed at top and bottom. Shellac bark edge and paint wood.
11. **Large cavity** here is properly filled in sections. But before doing cavity work, decide if work is worthwhile. Old, slow growing trees are seldom worth effort. Good rolls of callus growth around large cavities are strong, and removal weakens tree. Best treatment may be to brace cavity area and fertilize tree.

areas, an alternate method is worth trying. Tack the loose bark back onto the trunk and shade the damaged bark area with a burlap shield. Install this shield a few inches from the trunk to allow for air circulation. This sometimes keeps the cambium cells alive to produce callus growth and reduces the size of the wound. When it doesn't work, bark trace and treat.



Cabling may be used to support heavy or overhanging limbs, however, only the minimum number to meet the existing problem should be used. Extra cables may create problems. Various systems are used. To repair or prevent limb breakage use the simple direct, left above, which is a single cable connecting two limbs arising from a single crotch; box or rotary, center, a series of cables connecting four or more limbs in a rotary fashion which permits maximum crown movement but no direct support; or triangular, right, which is the cabling together of limbs in combination of threes. This latter combines the best features of all systems and is preferred. Bands, cables or chains choke tree during future growth.

Judicious Pruning Insures Future Shape

Pruning is done for a variety of good reasons. But it needs to be planned carefully to maintain the shape of the trees. Even when trees are interfering with overhead wires, judicious pruning and planning for future growth can usually be done to maintain the shape and prevent interference with the wires.

When pruning branches one inch or more in diameter, make three cuts (see illustration). This prevents peeling of bark as the limb falls. Final cuts need to be smooth. Avoid loose bark and be sure they are flush with remaining branches or trunk. This promotes rapid healing. Always start pruning at the top of the tree and work downward. Remove all dead, dying, diseased, and interfering branches. Treat larger wounds with a wound dressing. Renew this at least once or twice a year because of checking or weathering.

In treating solid, surface wounds, all exposed wood resulting from bark tracing, pruning, and cavity work should be treated with a wound dressing. Best procedure seems to be to paint the exposed bark edges with orange shellac followed by an application of an asphalt base paint over the entire wound once the surface is dry. Such dressings as asphalt varnish, fibrated asphalt roofing paints, and water-asphalt emulsions have merit. Water-asphalt emulsion can be applied to both wet and dry surfaces at temperatures above 32 F. Do not use asphalt preparations which contain carbolineum, creosote, gasoline, or similar materials. Mixtures such as 10-2-2 of lanolin, rosin, and crude pine gum; shellac over-coated with plastic asphaltum; and Bordeaux paint are examples of other cambium and wound dressings. Asphalt applications need to be thin to moderately thick to prevent blistering. Reapply at least once yearly, after carefully removing old, peeled coatings. Cover only exposed wood, and not the callus roll.

Wounds less than one inch in diameter on hardwood trees need not be painted. Small wounds on evergreen trees can be ignored or protected by smearing the wound with the resins exuding from the cut. Large wounds on evergreens need to have the exuding resin smeared after asphalt paint is applied.

Avoid use of regular house paint. Those containing oil are sometimes used by amateurs, but their value is doubtful. Oil paints or other oil preparations will kill back bark on sugar maples. If applied completely around the trunk, young sugar maples will usually be killed. The same may occur on beech, butternut, and exotic maples.

Cables should consist of galvanized material strong enough to stand expected stress. For example, 7-strand 1/4-inch and 5/16-inch cables are rated at 500 and 1000 pounds of stress. Thimbles, lags, or eye bolts need to be coated with a rust-resistant material. If the rust coating is damaged during installation, apply a protective coating. Lag screw hooks may open under stress, so are not reliable. Thimbles are used in each eye splice to prevent parting of the cable where it passes through the eyebolts.

Screw rods with nuts and washers are needed for bracing through and near weak crotches. These need to extend completely through involved limbs. At least 2 are needed for large limbs. Bore holes for screw rods with lag threads 1/16 inch smaller than the rod. Countersunk washers and nuts at both ends increase holding power. For bolt rods with machine threads, bore holes the same diameter as the rod. Bolt rods are best for soft or weak wood, or where there is less than 3 or 4 inches of sound wood at each end.

Washers and nuts should be countersunk, the cuts pointed above and below, and all cuts and bolts then treated. Once washers and nuts are in place, exposed parts of wood, bolts and nuts need to be waterproofed.

When installing cables, make them just taut. Inspect occasionally for breakage of cable strands and remedy any slack or replace as needed.

Recommendations for this WTT Tree Care Report are based on technical material of the Maine Forest Service. Illustrations likewise are based on Maine recommendations for preserving shade trees and supplied by Maine State Entomologist Robley W. Nash, Augusta.

Book Review

Breeding Pest-Resistant Trees

By H. D. Gerhold, E. J. Schreiner, R. E. McDermott, and J. A. Winieski, (Pergamon Press, 44-01 21st Street, Long Island City, New York, 11101), 1966. 505 pp., $24.00.

This is a classic in a subject rarely covered so thoroughly by top workers in the field of tree disease prevention by the use of genetics. It is an exhaustive report on the problem as it exists today and how it might be solved in the future through selective breeding. The book is edited by Henry D. Gerhold (PhD) and Robert E. McDermott (PhD) from the School of Forest Resources, Pennsylvania State University, Ernst J. Schreiner (PhD), Northeastern Forest Experiment Station, Durham, North Carolina, and John A. Winieski (MS), Pennsylvania Dept. of Forests and Waters, Harrisburg, Pennsylvania, with over a hundred other participants from various other countries.

The book covers the proceedings of a NATO and NSF Advanced Study Institute on Genetic Improvement for Disease and Insect Resistance of Forest Trees held at the Pennsylvania State University, University Park, Pa., Aug. 30 to Sept. 11, 1964. Although intended more for the professional arborist, the book contains good background material for anyone interested in trees.

Subjects covered included research activities relative to tree disease being conducted throughout the world, advances in the basic knowledge of disease and insect resistance of trees, the approaches and methods for genetic improvement in pest resistance of trees, and future needs for such programs.

It becomes obvious that the science of disease prevention in trees by selective breeding is pretty much in the same stage as it is with humans. There is little danger that the "tree doctor" will soon be out of work.

Prescription Forests Now Feasible

Desirable forests might well be regenerated on a "prescription" basis. Selected varieties of seedling trees would be planted and fertilized. So says a Pennsylvania State University scientist, Dr. Robert D. Shipman, associate professor of silviculture. A basic objective, he believes, is renewing wood products, wildlife, and recreational resources by establishment of vigorous, desirable species of trees capable of rapid development.

The need today is to convert submarginal forests to faster growing trees than generally exist, trees that mature rapidly and are of value to the forest products industries. At present about 73 percent of commercial forest land in Pennsylvania is covered with slow-growing, pole-sized hardwood timber that is often of low quality.

The Penn State scientist believes rundown forests can be

(Continued on page 34)

Virginia sod producers organize. Virginia Cultivated Turfgrass Association is name chosen by new organization meeting recently at Middleburg, Va. Discussing Virginia's new sod law with group is Dennis E. Brown, Richmond, supervisor of state's Seed Regulatory Services, Department of Agriculture.

Turf Producers Form the Virginia Cultivated Turfgrass Association

Sod growers hope to improve the quality of turf sold in Virginia. They believe this is the nationwide trend. With this in mind they have formed a state association to be known as Virginia Cultivated Turfgrass Association.

Approximately 50 growers who gathered March 3 and formally organized believe this to be the opportune time to band together for purposes of building their industry. Virginia's General Assembly passed a sod law last year and the state Crop Improvement Association has recently put into operation a program for certifying and approving sod.

Under the existing Virginia Crop Improvement Association program, sods meeting standards set by the Association can be sold as approved sods.

John F. Shoulders, associate Extension agronomist at Virginia Polytechnic Institute, Blacksburg, reports that the institution and Crop Improvement Association plan to work closely with the new organization. Shoulders, along with personnel of the Virginia Department of Agriculture, worked with growers in getting the new sod group organized. They feel it will be beneficial to growers in developing improved methods of sod production, marketing, and installation. Because Virginia is located near the Washington, D. C., metropolitan area, as well as other major eastern cities, Shoulders thinks the group can profitably coordinate its activities closely with Maryland and other nearby states which supply sod to the region. Both Maryland and New Jersey have state associations, and the national association headquarters is at Washington, D. C.

Temporary officers elected by charter members of the group are: George C. Calder, Clifton, president; Frank D. Cox, Manassas, vice-president; and Sheldon Betterly, Centerville, secretary. President Calder has announced that membership is open to persons and organizations actively engaged in production, marketing, and installation of sod.

Right-of-Way Vegetation Management Book Planned

A how-to-do-it book on right-of-way vegetation management is being planned by The Smithsonian Institution Office of Ecology. It is being written specifically for engineers and managers of the North American right-of-way domain.

Included is vegetation-covered land of highways, railroads, and electric power and pipeline companies. Goal of the book is to provide sound scientific vegetation management practices aimed at low cost combined with high conservation of science and natural resources, and at the same time to keep within the specific engineering needs of the administering agency.

Dr. Frank E. Egler, Aton Forest, Norfolk, Conn., 06058, is authoring the book. He plans to include factual botanical specifications for various vegetation regions of the continent, preferably based on sound management programs already in progress. He reports he would appreciate any correspondence from managers, scientists, naturalists, agencies, societies, and corporations. Those who respond will be asked to prepare brief vegetation descriptions from actual localities, to later appear in the book over the names of their authors. Contributions are to be similar in form to the 4-page Old Saybrook paper, a copy of which Dr. Egler will provide.

I.S.T.C. Convention Moves to Motel

Visitors to the 1967 International Shade Tree Conference convention will meet in a motel for the first time. Richard Flynn, chairman of the group's public relations committee, says the Marriott Motor Hotel at Philadelphia, Pa., was chosen because of its size and location.

Because it is smaller than the large hotels where the convention has been held previously, the committee feels that convention-goers, Aug. 27-31, will be better able to coordinate their activities. Quality of service should be superior since the Motel is of such a size that the entire staff and facilities will be available for meeting needs of I.S.T.C. members.

The Marriott is a new motel with 450 rooms and 4 restaurants. It is located 10 minutes from downtown Philadelphia by expressway and shuttle service will be available for sight-seeing and shopping. For those who drive, the parking problem will be eliminated. Flynn reports that program details will be announced shortly.

One shot of this low-cost soil sterilant is usually enough.

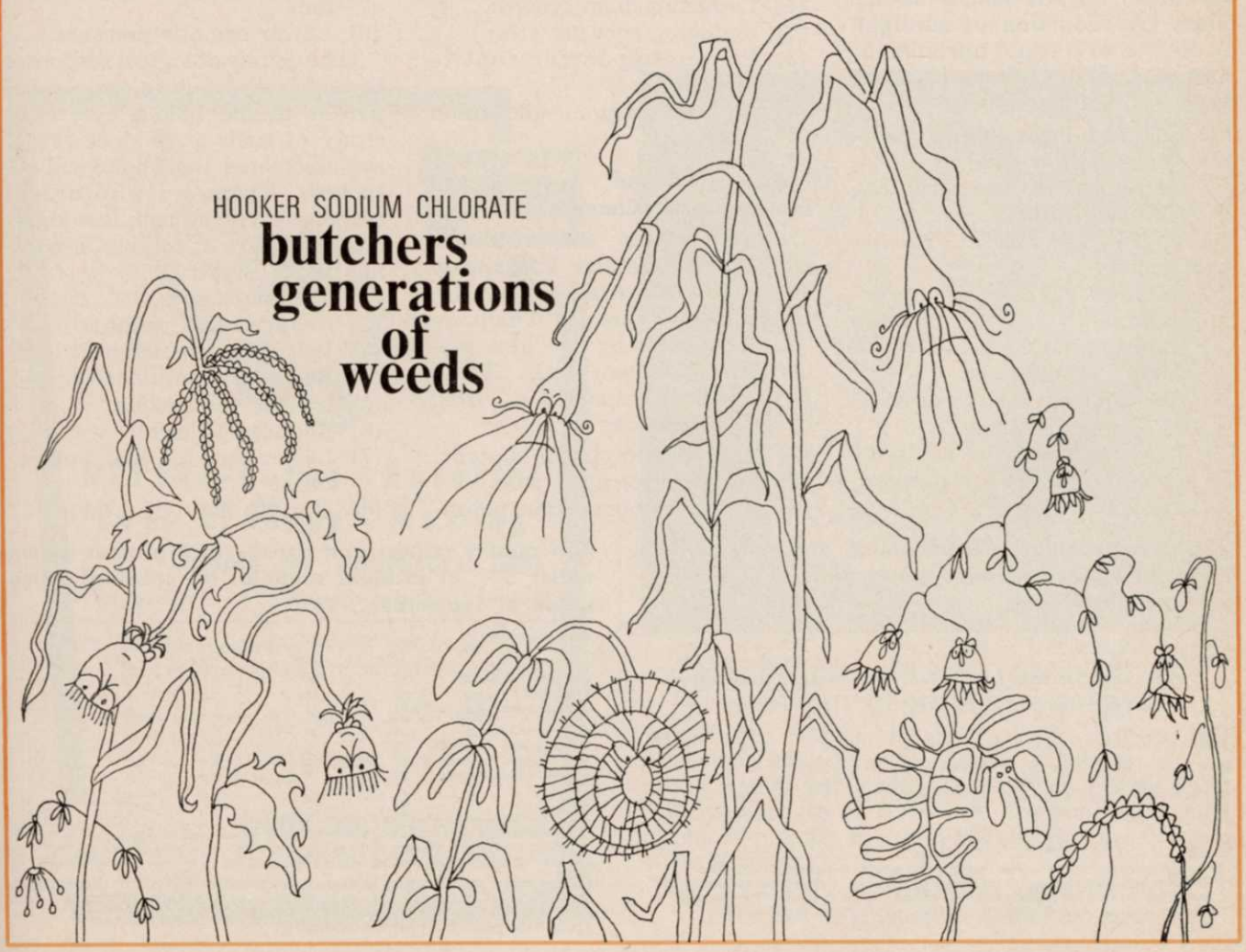
Hooker sodium chlorate sinks deep into the soil to destroy roots and germinating seeds. It sterilizes heavy soils for as long as two years, sandy soils for as long as one.

Almost 40 years of weed control prove it. Knocks out virtually any weed you can name.

For use along railroad tracks and on industrial sites, Hooker sodium chlorate usually is combined with other inorganic chemicals for effective, inexpensive, and safe control.

For more information, talk to your Hooker distributor. Or write Agricultural Chemicals, Hooker Chemical Corporation, 405 Buffalo Avenue, Niagara Falls, New York 14302.

hooker



Adequate Turf Stands Under Shade Are Possible With Careful Culture

Getting suitable turf stands under shade trees can be solved, though the quality can never be expected to be as good as that on an open lawn. That's the thinking of Dr. James B. Beard, department of Crop Science at Michigan State University.

Shaded turf culture becomes important to the landscape contractor with realization that about 20% of existing turf is being grown under partial shade. Dr. Beard suggests sizing up the problem area carefully prior to establishing a seeding. Such factors as whether trees are open crowned types, such as honey locust, or whether they exclude more light, as is the case with Norway maple, Linden or white oak, bear on the course to be taken. A reduction of sunlight by 50% to 95% is not uncommon.

Dr. Beard lists 8 key effects of shade on turf stands:

(1) Reduced light intensity.
(2) Altered light quality.
(3) Extremes in temperatures are moderated.
(4) Wind movement is restricted.
(5) Relative humidity is increased.
(6) Intensity and duration of dews are increased.
(7) Atmospheric carbon dioxide levels are decreased.
(8) Turf is forced to compete with tree roots for water and nutrients.

Current research shows a definite need for cultural practices keyed to shaded turf conditions, and the use of adapted grass mixtures. Michigan trials point to several combinations which are best for the shaded home lawn such as this.

When turf is forced to survive in shade, the above ground portions of the plant received priority in terms of food available to the plant. Shade affects turf by:

(1) Reducing shoot growth.
(2) Reducing root growth.
(3) Producing lower root to shoot ratio.
(4) Reducing rhizome and stolon growth.

Physiological and Morphological Changes

Fewer shoots and rhizomes which are generally less sturdy add up to less overall plant vigor. Physiological changes which result from shading are also evident in Michigan trials. These physiological responses as listed by Dr. Beard are:

(1) Higher chlorophyll content.
(2) Lower respiration rate.
(3) Lower compensation point.
(4) Lower carbohydrate to nitrogen ratio.
(5) Lower carbohydrate level.
(6) Reduced transpiration rate.
(7) Higher tissue moisture content.
(8) Lower osmotic pressure.

Though physiological responses to turf from shading are not apparent to the naked eye, close study of such grass does reveal the associated morphological responses. These morphological responses which mean less vigorous plants are as follows, according to Dr. Beard:

(1) Thinner leaves.
(2) Reduced leaf weight.
(3) Increased leaf length.
(4) Reduced shoot density.
(5) Longer internodes.
(6) Reduced tillering.
(7) Lower rate of leaf appearance.
(8) Upright habit of growth.

Species composition, density count, and turf quality ratings of 8 grass mixtures grown under 5% of incident sunlight.

Grass mixture*	Composition, %		Density counts‡		Turf quality ratings (1-best; 9-poorest)§		
	Original seed†	Plants on 10/10/64	1962	1964	1962	1963	1964
F-K	50-50	86-14	16	39	6.8	6.4	3.9
F-K	75-25	91-9	22	41	7.0	5.5	4.4
F-K	25-75	92-8	27	33	6.2	6.0	4.6
F-R	50-50	68-32	48	35	3.3	5.6	5.5
K-R	50-50	17-83	56	22	3.3	5.0	5.5
F-K-P	33-33-33	63-11-26	23	30	6.5	5.6	5.6
F-K-R	33-33-33	45-12-43	46	59	3.9	5.2	5.7
K-T	50-50	32-68	16	19	6.9	5.2	5.8
		LSD, 5%	11.5	14.5	.0.8	1.0	1.8
		DR, 5%	13.2	16.6	0.9	1.1	2.0

* F-Pennlawn red fescue; K-Common Kentucky bluegrass; R-Roughstalk bluegrass; P-Common perennial ryegrass; T-Kent, 31 tall fescue. † Based on seed numbers. ‡ Shoots per 12.5 sq. in., counts made the second week in October. § Average of the seasonal ratings. ¶ Duncan's range test for equality with p of 8.

Turf quality ratings and density of 7 grasses grown under 5% of incident sunlight, all seedings being made in September, 1961*

Grass variety	Density count*		Turf quality rating†		
	1962	1964	1962	1963	1964
Pennlawn red fescue	25	34	6.5	5.4	4.3
Roughstalk bluegrass	54	44	3.2	4.9	5.8
Common peren. ryegrass	23	10	5.9	5.3	7.0
Kent, 31 tall fescue	18	10	6.8	7.0	7.3
Common Kent. bluegrass	15	4	7.9	6.7	8.1
Norlea peren. ryegrass	10	1	6.0	6.7	8.7
Merion Kent. bluegrass	10	0	7.4	9.0	9.0
LSD, 5%	11.5	14.5	0.8	1.0	1.8
DR, 5%	13.1	16.4	0.9	1.1	2.0

* Shoots per 12.5 square inches, counts made the second week in October.
† (1-best; 9-poorest) Average of the seasonal ratings.
‡ Duncan's range test for equality with p of 7.

In comparing these two tables, it is notable that after three years, the 33-33-33 mixture of red fescue, roughstalk bluegrass, and Kentucky bluegrass was higher in density than any one of the grass components planted alone.

Adaptability To Shade Studies Continue

Trials on turf growth in shade are continuing at Michigan State University but already have produced some tangible results. Among conclusions drawn is one in favor of fall seeding, because of extended light periods in both fall and spring. Bentgrass which performs best in sun also does best in shade.

Roughstalk bluegrass and common Kentucky bluegrass were both lost by disease in trials; Pennlawn red fescue was hurt but did recover. Kentucky bluegrasses are not good for shade because of susceptibility to powdery mildew.

For density of growth, the best grass variety mixture proved to be Pennlawn red fescue, roughstalk bluegrass and common Kentucky bluegrass.

For quality, the most superior mixture of grasses was 50% Pennlawn creeping red fescue and 50% common Kentucky bluegrass, on a seed count basis.

Dr. Beard reports that bentgrass is fairly well adapted to shade but water must be available to get it established. Disease, he said, proved to be the primary cause of turf loss in Michigan tests. Ground under trees was plowed six inches deep prior to reseeding under shade. For contractors doing this type work, Dr. Beard has suggested light irrigation only for establishing red fescue and sparse use of nitrogen. He believes nitrogen use should be kept below 4 pounds per year on red fescue.

In the Michigan tests, sandy loam was limed to a pH of 6.0. Adequate phosphorus and potassium were used along with 2 pounds of nitrogen per 1,000 square feet, half in the spring and half in the fall. No irrigation was used. All seedings were made, alone and in mixtures, during early September 1961. Plots were planted on a seed count basis, 3½ million seeds per 1,000 square feet.

A summary of recommendations for establishing turf in shade areas based on Michigan State University tests under the supervision of Dr. James B. Beard are as follows:

1. Use adapted species such as Pennlawn red fescue for Michigan and similar areas.
2. Raise the height of normal mowing about 1 inch.
3. Avoid excessive nitrogen fertilization (keeping disease problems down by not providing succulent plant growth).
4. Practice deep, infrequent irrigation.
5. Avoid excessive traffic.
6. Select trees with more open crowns.
7. Thin crowns of trees.
8. Improve air movement by removing solid screens or barriers of shrubs.
9. Practice shallow tree root pruning to reduce root competition.
10. Remove fallen leaves promptly in the fall.
11. Use deep fertilization for tree roots.
12. Prune tree limbs to heights of 8-10 feet.

Meeting Dates

Chemical Marketing Research Association, Annual Meeting, Plaza Hotel, New York, N.Y., May 15-17.

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

National Plant Food Institute, Annual Convention, The Greenbrier, White Sulphur Springs, W. Va., June 11-14.

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

American Society of Landscape Architects, Annual Conference, Hotel Regency, Atlanta, Ga., June 25-28.

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

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

Southwestern Fertilizer Conference and Grade Hearing, Annual Meeting, Skirvin Hotel, Oklahoma City, Okla., July 19-21.

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

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

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

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

American Society for Horticultural Science, Annual Meeting, Texas A. & M. University, College Station, Aug. 27-Sept. 1.

Pacific Northwest Spraymen's Association, Annual Conference, Seattle, Wash., Sept. 15-16.

National Agricultural Chemicals Association, Annual Meeting, Holiday Inn, Palm Springs, Calif., Nov. 5-8.

American Society of Agronomy, Annual Meeting, Sheraton-Park and Shoreham Hotels, Washington, D. C., Nov. 5-10.

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

Systemic Fungicides For Stripe Smut

By J. R. HARDISON

Research Plant Pathologist, Crops Research Division, Agricultural Research Service, U. S. Department of Agriculture, and Department of Botany and Plant Pathology, Oregon State University, Corvallis, Oregon.

Trade names are used solely to provide specific information. Mention of a trade name does not constitute a warranty of the product by the U. S. Department of Agriculture nor an endorsement by the Department over other products not mentioned.

Recent publicity on stripe smut (*Ustilago striiformis*) in bluegrasses focused attention on an important turf disease. The purpose of this article is to describe encouraging results with systemic chemicals, because effective chemical control will permit continued use of smut-susceptible but otherwise high-quality bluegrass varieties, such as Merion.

The tardy development of suitable chemicals prompted the recent suggestion that the most promising method of controlling stripe smut will be by selection and breeding resistant varieties. Yet, the failure to produce a comparable new variety during the 20 years that Merion bluegrass has been in general use illustrates that bluegrass improvement is a slow process. Although a number of smut-resistant bluegrass selections have been found, great difficulty is encountered in locating smut-resistant plants with all the other desirable turf qualities of existing varieties.

A few promising new varieties have failed to produce sufficient seed for commercial use. Diseases other than stripe smut have ruined certain bluegrass selections and will probably eliminate some additional selections when they are multiplied. Finally, it should be mentioned that resistance to plant diseases is often temporary, particularly with rusts, smuts and mildews, because new races of pathogens arise to attack previously resistant plants. New bluegrass varieties resistant to smut probably will be developed eventually; meanwhile, stripe smut control by new fungicides will enable continued general use of time-proven varieties.

Chemical control of stripe smut is particularly difficult because of the infection of adult plants. Seed treatment has only limited value. Prevention of infection might be possible by a number of protectant-type fungicides. This approach has been unattractive because of the probable need for frequent applications of excessive quantities of chemicals which increase both cost and nuisance.

The best hope for feasible chemical control of stripe smut lies in development of systemic fungicides. Such sophisticated chemicals are absorbed by the plants and eradicate or suppress existing infections. Hopefully, some of these chemicals may also prevent new infections. Testing of systemic chemicals for stripe smut control is now in progress at several state agricultural experiment stations. Additional chemicals can be expected from the chemical industry since the turfgrass market has much to offer. The nonfeed, nonfood classification of turfgrass greatly eases the chemical residue restrictions. In addition, relatively more plant injury can be tolerated in turf. Therefore, a new chemical can be brought to the market for turf much faster than for food or feed crops.

Testing of systemic chemicals for stripe smut control is now a major effort in the regional USDA grass disease project in cooperation with Oregon State University at Corvallis. We are prepared to work with all chemical companies in evaluation of candidate systemic chemicals in the development of new fungicides for stripe smut.

A significant breakthrough in chemotherapy was made during 1966 in the studies at Corvallis. Flag smut (*Urocystis agropyri*), one of two diseases involved in

the turf smut problem, was eradicated within infested plants of Kentucky bluegrass by root absorption of a new systemic chemical, Plantvax, (2,3-dihydro-5-carboxanilido-6-methyl-1, 4-oxathiin-4,4-dioxide), supplied by the United States Rubber Company, Naugatuck, Connecticut. Bluegrass plants growing in soil treated with Plantvax in November 1965 have remained smut-free through February 1967. This chemical has also given long-term control of stripe rust (*Puccinia striiformis*) in bluegrass plants. Plantvax provided fair inhibition of stripe smut in bluegrass plants as was also found in tests at Connecticut. Recently another new systemic fungicide, Demosan, (1,4-dichloro-2,5-dimethoxybenzene), manufactured by the E. I. duPont de Nemours & Company, Wilmington, Delaware, has been found to inhibit stripe smut in infected bluegrass plants by Dr. Ray Lukens in studies at the Connecticut Agricultural Experiment Station.

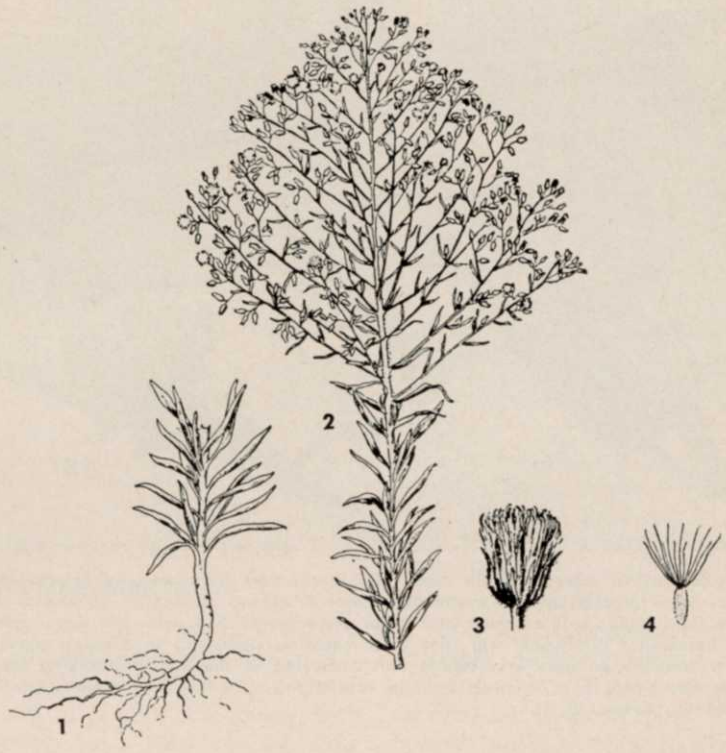
The above results and the current level of chemical testing activity justify optimism that systemic fungicides will become available which will furnish control of stripe smut by inhibition of the fungus. In such fungistatic action the chemical suppresses the fungus within the plant, so that no symptoms of the disease are evident. Although the pathogen may not be killed, the fungus activity is greatly reduced. As a result the plants resume normal growth and thereby escape damage while appearing to be "smut-free." The first systemic chemical products for stripe smut may be of this type, and they will probably furnish effective control for one to several months by a single application. Thus, only a few applications per year should suffice for satisfactory control. At the present rate of progress, however, true eradicant systemic chemicals that will kill the fungus within the plant should also become available.

That promising results on chemical control are being obtained is highly encouraging for continued use of Merion, because most turf experts agree that Merion bluegrass will probably continue to be a favorite turf-

Know Your Species

HORSEWEED

(Erigeron canadensis)



Horseweed is called marestail and is also sometimes known as Canadian fleabane, common fleabane, or bitterweed.

A native plant, horseweed is common throughout North America and grows in waste areas, along roadsides and in pastures. Readily takes over abandoned areas. Thrives mostly on rather dry soils from July through October.

An annual which reproduces by seed, horseweed grows from 1 to 6 feet in height. Leaves are narrow, alternate without petioles, and 1 to 4 inches long, lower leaves sometimes having toothed edges (1). Stems are stout, hairy, erect, and unbranched at the base but with many branches at the top (2). Leaves arranged close together along stem resemble a horse's tail and give plant its common names.

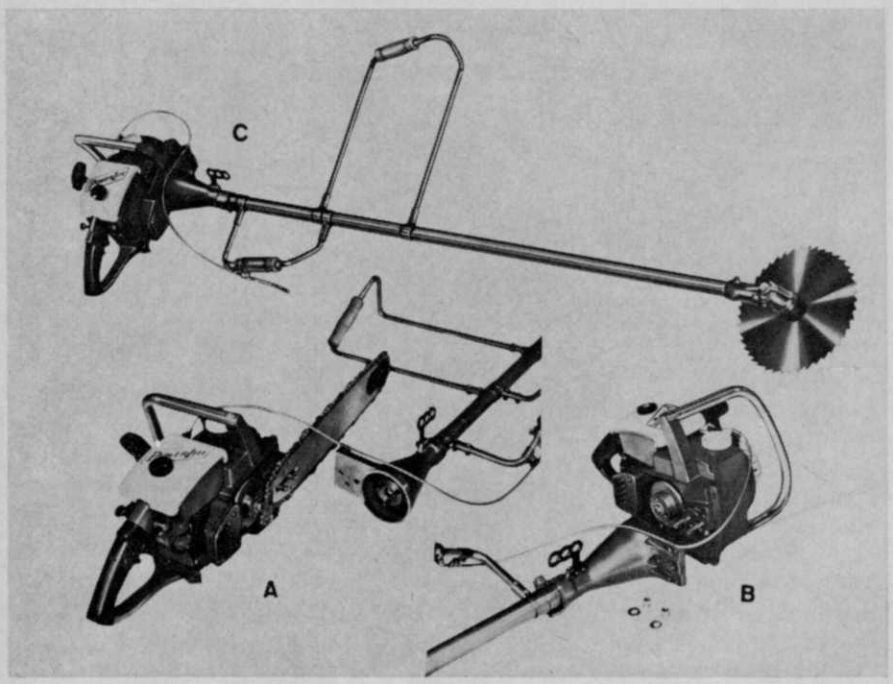
A number of tiny white ray flowers, usually more than 100 per head, are produced by the plant. Yellow disk flowers form a loose head at the top (3). Seeds are slightly curved, and have a number of slender white bristles on one end (4) which permit the wind to carry them. The seed proper is about $\frac{1}{16}$ inch long.

Horseweed is somewhat resistant to 2,4-D but one pound per acre is fairly effective when plants are small and growing rapidly. Higher rates or repeated applications are usually needed for effective kill. Both 2,4,5-T and Silvex at 1 pound per acre rates are more effective than 2,4-D. At a rate of 2 pounds per acre and with repeated applications, 2,4-DB is fairly effective.

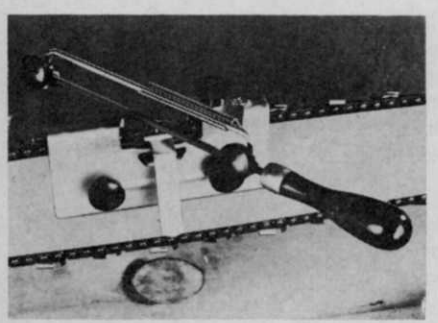
Prepared in cooperation with Crops Research Division, Agricultural Research Service, United States Department of Agriculture, Beltsville, Maryland.

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

New Products.....

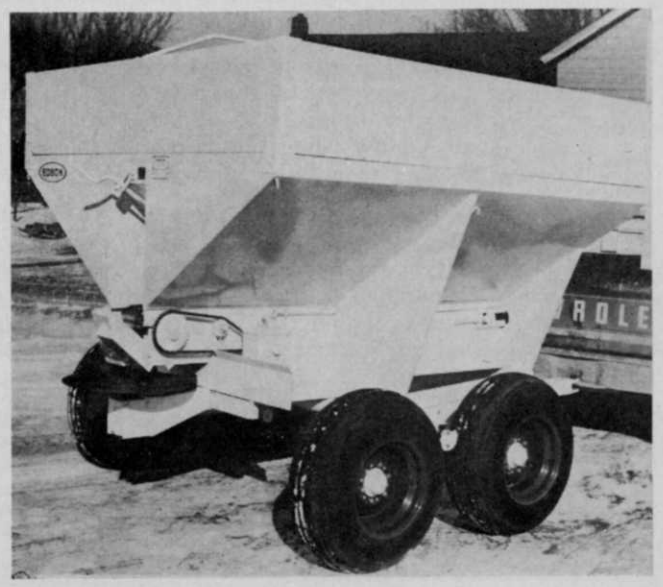


New attachment to convert chain saws into brushcutters introduced by Rowco. (A) Chain saw engine with sprocket cover removed and Rowco Brushking brushcutter attachment in place to engage clutch. (B) Chain saw bar and chain are removed and, with pin drive clutch drum in place, brushcutter attachment will slide onto mounting studs. (C) In minutes, conversion is made to a complete portable brushcutting unit comprised of the Rowco Brushking Model 321 brushcutter attachment and lightweight chain saw engine. Contact Rowco Manufacturing Co., 48 Emerald St., Keene, N. H.



For chain saw users, a simple-to-use sharpener for field or shop without removing the saw chain. Regulates its own height, holds tooth being filed positive, includes positive go-and-no-go guide gauge and adjusts automatically to various chain sizes. Of 100% heavy-gauge steel construction, it provides a v-guide for file holder and includes 7/32 Oberg File. Write Pakard, Inc., 3839 Merle Hay Rd., Des Moines, Ia.

Hawk Bilt/Edson Spreader from Hawk Bilt Manufacturing Corp., Vinton, Ia., features controlled high-volume spreading with simple design and minimum of moving parts. Pull type with 12-gauge stainless steel hopper bottom, the spreader is rated as a 4- to 5-ton unit with 152-cu.-ft. capacity. Full-floating oscillating tandem axle with 2-inch heavy-duty spindles keeps each wheel carrying full share of load, regardless of terrain. Ground-driven 10-inch stainless steel conveyor moves flow of fertilizer.



grass as soon as stripe smut is controlled. Merion produces the dark green, dense turf that is so much desired, is widely adapted, and has good resistance to Helminthoporium leaf and culm rot. Merion has to be considered an outstanding variety, because it has furnished nearly trouble-free turf in many areas for more than 20 years. No other bluegrass variety has this long record of satisfactory performance in extensive use under a wide range of soils, climates, diseases and pests throughout the northern half of the United States.

In summary, recent progress in systemic fungicides as shown by eradication of flag smut by Plantvax, fair inhibition of stripe smut by Plantvax and Demosan, and the intensive search for other systemic chemicals, indicate that a satisfactory chemical control of stripe smut will become available. New plantings of Merion started in 1967 will surely be provided with an effective chemical control during the several years before stripe smut becomes a problem. Such chemicals would also restore older plantings to a smut-free condition.

Sarolex Found Effective Against Florida Nematodes

During four years of testing at the Everglades Agricultural Experiment Station of the University of Florida, a nematocide produced by Geigy Chemical Corp., called Sarolex, was the only one tested which consistently caused no injury to turfgrass and was safe for use on golf greens and home lawns. It is a specially formulated Diazinon compound for soil application for nematode and soil insect control.

Reporting results of the tests, Dr. J. S. Winchester, assistant nematologist with the station, says at a rate of ¾ pint per 1,000 sq. ft. of turf, Sarolex gave good control of sting nematodes and sod webworms on Everglades No. 1 bermuda.

Nematodes responsible for most of the turfgrass injury in the state are sting, root knot, stubby root, and spiral nematodes the scientist says.

At least 65% of the unthrifty

turf in Florida is due to these pests, Dr. Winchester estimates. In early stages, sting nematode-infested turf roots appear cut off 4 or 5 inches beneath the soil surface. Stubby root nematodes cause colorless lesions near root tips, while spiral nematodes cause small lesions all along the roots. Root knot nematodes cause small galls on roots.

Sarolex does not kill weeds, but increased grass vigor caused by the control measure gives grasses a better chance to compete with the weeds.

Applications to St. Augustinegrass also gave good nematode control, Dr. Winchester relates. He says zoysia and centipede grasses infested by root knot nematodes were treated with 1½ pints of Sarolex per 1,000 sq. ft. They maintained vigorous green color a year later while surrounding grass was dead.

The nematocide must be applied at low pressure (35-60 psi) and it must be "drenched" into the soil right after applying to avoid turf injury.

Herbicides Stop Growth Of Crabgrass Seedlings

Crabgrass seed germination is not inhibited by preemergence herbicides, as commonly believed. Rather, these herbicides stop growth of both roots and shoots soon after germination. This leads to death of the young crabgrass seedlings.

This new facet of research is reported by Dr. Clayton Switzer, University of Guelph, Ontario, Canada, who has just completed experiments in this area.

In studying several commonly used preemergence crabgrass herbicides, Dr. Switzer reports that very little herbicide is needed to bring about this growth inhibition, much lower than must be used in practical applications on turf. This, he says, indicates that much of the herbicide is probably inactivated soon after application, possibly by being tightly adsorbed to the soil particles.

Other Canadian research on movement of bensulide, a common preemergence crabgrass weed killer, substantiates this idea. Little downward movement of herbicide was found even though large quantities of water were leached through the soil.

Mr. and Mrs. Wyn Behrens, publisher and editor respectively of the Marysville Journal-Tribune, appear a bit pensive as they watch sod for the lawn of their new home being laid on a 4-inch concrete base. One neighbor, watching the concrete being poured, thought the Behrens' were making a parking lot.

Sod Over Concrete Proves An Unusual Innovation

Citizens of Marysville, O., were a bit shocked recently when Mr. and Mrs. Wyn Behrens laid their new sod on a concrete base. But the new turf is thriving and neighbors have accepted the idea that turf can be made to grow on about any type surface.

The Behrens' permitted the O. M. Scott & Sons Co. to use the lawn of their new home as a demonstration area to show that a good lawn doesn't necessarily have to be grown on quality topsoil. Scotts has grown sod on old driveways, atop rocks and in so-called "impossible" soils, and now on concrete.

The turf is kept green with a modest daily watering and the use of a fertilizer every second month. It is weed free. The company believes it will grow well indefinitely.

Naturally, Scotts is not recommending concrete as a base for sod, unless, of course, a pure sand or gravel area has to be sodded. They simply wanted to show proof that good soil isn't a must for quality turf, and still recommend soil as a more favorable environment than concrete.

Most States Operate Chemical Info Centers

For the operator or grower seeking pesticide chemical information, most state Extension Services operate a full-time center.

Information is available by contacting the Cooperative Extension Service at the state land-grant university.

Such centers have data on regulations, registered uses, toxicities, persistency, degradability, compatibility, and safety precautions of pesticide chemicals, and feed and food additives.

Major activities, according to Dr. L. C. Gibbs, coordinator of Pesticide-Chemicals Programs for the United States Department of Agriculture Federal Extension Service, fall into specific categories such as: (1) depth training programs for aerial and ground pesticide-chemical applicators and dealers; (2) development of visual aids and publications for the public; (3) surveys and projects to provide guidelines for developing future programs; (4) program coordination; and (5) dissemination of pesticide information on all aspects of pesticide use, storage, handling, and safety.

Insect Report

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

Turf Insects

BURROWING STINK BUGS

Alabama: Adults of *Panagaeus bilineatus* and/or *Tominotus communis* heavy in a 3,000-square-foot lawn of centipedegrass in Greenville, Butler County. These insects caused severe damage to peanuts in several southeastern counties in 1966.

A GROUND PEARL
(Margarodes meridionalis)

Alabama: Observed in turf in Bullock County.

RHODESGRASS SCALE
(Antonina graminis)

Texas: Moderate and common on rhodesgrass throughout southern area. Ranged 1.5-3.9 scales per node and have doubled since February. A small ENCYRTID WASP *(Neodusmetia sangwani)* controlled 8.8-33 percent of the scales.

Ornamentals

A CONIFER APHID
(Cinara tujafilina)

New Mexico: Moderate to heavy on arborvitae at Hobbs, Lea County.

PRAIRIE TENT CATERPILLAR
(Malacosoma lutescens)

Kansas: Large numbers of early-instar larvae of probably this species, feeding on cherry and plum in Clark and Meade Counties, ranged 1-10 nests per shrub.

A COREID BUG
(Jadera haematoloma)

Oklahoma: Heavy numbers damaging western soapberry in Durant, Bryan County.

OMNIVOROUS LOOPER
(Sabulodes caberata)

California: Larvae medium on fatshedera plants in Santa Maria, Santa Barbara County. This pest was more widespread and occurred on a wider range of hosts than usual during 1966.

AZALEA LEAF MINER
(Gracillaria azaleella)

California: Larvae medium on azalea nursery stock in Vista, San Diego County.

BOXWOOD LEAF MINER
(Monarthropalpus buxi)

Virginia: Medium on American boxwood in Chesterfield, Henrico, Hanover, Goochland, and Charlotte Counties. Heavy on boxwoods at Chatham, Pittsylvania County.

FALSE SPIDER MITES
(Brevipalpus spp.)

California: *B. obovatus* adults medium on honeysuckle vines in Escondido, San Diego County. *B. essigi* eggs and adults light to medium on fuchsia nursery stock in San Luis Obispo County.

AN OLETHREUTID MOTH
(Laspeyresia cupressana)

California: Larvae heavily damaged twigs of Italian cypress in San José, Santa Clara County.

ARMORED SCALES

California: *Hemiberlesia rapax* and *Aspidiotus camelliae* heavy on all parts of heather at Mission Beach. *H. rapex* heavy on loquat in La Jolla, San Diego County. *Aspidiotus nerii* heavy on acuba plants locally in Glenn, Glenn County.

BROWN SOFT SCALE
(Coccus hesperidum)

California: Heavy on leaves of schefflera plants in San Francisco, San Francisco County.

CALICO SCALE
(Lecanium cerasorum)

California: Locally heavy on deciduous magnolia shrubs at San José, Santa Clara County.

Tree Insects

APHIDS

Alabama: *Eulachnus* spp. infestations heavy on pine; 100-200 aphids infest outer 6-8 inches of each pine limb in most localities throughout east-central area. Heavy honeydew dripping into streets. **California:** *Pterocomma flocculosa* heavy on willow along State highway in Arroyo Grande, San Luis Obispo County. **New Mexico:** *Cinara* sp. problem on ponderosa pine in Albuquerque area, Bernalillo County. **Texas:** *Longistigma caryae* heavy on live oaks throughout Dallas, Dallas County.

A LONG-HORNED BEETLE
(Neoclytus caprea)

Nevada: Larvae and adults medium on ash in Las Vegas, Clark County. New State record.

EASTERN LARCH BEETLE
(Dendroctonus simplex)

Wisconsin: Adults numerous in grove of native tamarack in Walworth County. Water table recently altered in area by fill-in operations.

SMALLER EUROPEAN ELM BARK BEETLE
(Scolytus multistriatus)

Ohio: Collected in Tiffin, Seneca County. This is a new county record.

BOXELDER BUG
(Leptocoris trivittatus)

Texas: Moderate on boxelder trees at Del Rio, Val Verde County.

A COREID BUG
(Leptocoris rubrolineatus)

Nevada: Adults active on boxelder and maple in Reno, Washoe County.

EASTERN TENT CATERPILLAR
(Malacosoma americanum)

Alabama: Widespread hatching and early feeding on cherry continues in southern area.

TENT CATERPILLARS

(Malacosoma spp.)

Florida: Late-instar *M. disstria* larvae on oak at Gainesville, Alachua County. **Illinois:** Small nests of *M. americanum* observed in southeastern area.

A SPIDER MITE

(Oligonychus subnudus)

California: Eggs and adults heavy on pine in San José, Santa Clara County.

NANTUCKET PINE TIP MOTH

(Rhyacionia frustrana)

Alabama: First adult emergence of season occurred in pine tree tips in Mobile and Baldwin Counties. Few adults merged as far north as Dallas County.

A PINE TUSSOCK MOTH

(Halisodota ingens)

Colorado: Third-instar larvae abundant and feeding on pine near Elbert, Elbert County.

OYSTERSHELL SCALE

(Lepidosaphes ulmi)

California: Heavy on willow along State highway in Arroyo Grande, San Luis Obispo County. Trees weakened by *Pterocomma flocculosa* infestations show greatest damage. **Maryland:** *L. ulmi* heavy on maple at Shadyside, Anne Arundel County.

A SOFT SCALE

(Ericoccus quercus)

Oklahoma: Noted on blackjack oak in Midwest City, Oklahoma County.

SOFT SCALES

California: *Ehrhornia cupressi* heavy on cypress in Fresno, Fresno County. *Saissetia coffeae* locally heavy on deodar cedar at San Francisco, San Francisco County.

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.

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.

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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.

Bacteria Break Down Weed Killers

Soil bacteria break down weed killers about as fast in the laboratory as they do in the field, according to University of Maryland Research Scientist Dr. James Parochetti.

Earlier research has attributed chemical loss to leaching (washing away by water) and volitilization (evaporation). But his study indicates that this is not the case.

Dr. Parochetti added soil separately to two chemicals, IPC and CIPC, and sealed them in laboratory flasks. Thus, no leaching or volitilization could take place. Any chemical loss had to be by microbial activity.

Chemicals broke down in this laboratory test about as fast as they did in field experiments. Dissipation of both chemicals, Dr. Parochetti concluded, was due almost entirely to bacterial action.

Conflicting reports regarding rates of dissipation of these chemicals led to Dr. Parochetti's experiments. Some reports had previously indicated that CIPC persisted longer in the field, and was therefore more effective for weed control. But he found that in both laboratory and field that 90% of both chemicals had dissipated within 4 weeks. However, he did find that CIPC was biologically more active and more toxic to plants. This facet alone would make it appear to last longer in the soil because smaller amounts of it would continue to kill weeds after the IPC had become ineffective.

Suppliers Personnel Changes

Thompson-Hayward Chemical Co., Kansas City, Kans., recently revealed the assignment of Ray Fitzgerald as manager of the company's newly organized north central region. Fitzgerald will manage marketing of T-H products from the company's Minneapolis, Omaha, and Des Moines operations. In another appointment, the chemical maker has added Albert A. Lockhard to the sales staff of its New Orleans, La., office.

Advertisers

INDEX TO ADVERTISERS

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.

Plant Pests of Importance to North American Agriculture, Index of Plant Virus Diseases, Catalog No. A 1.76:307, 1966, 446 pp., $2.50, Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

Pine Tip Moths, by C. R. Jordan, Head, Extension Entomology Dept., Leaflet No. 13, il., September 1964, Georgia Experiment Station, Experiment, Ga.

Applicator for Precision Placement of Chemicals in Soil, by R. F. Dudley and R. L. Ridgway, ARS 42-123, October 1966, 8 pp., il., U. S. Dept. of Agriculture, Agricultural Research Service, Beltsville, Md. 20705.

Common Poisonous Plants of New England, Catalog No. FS 2.2:P75/5, Reprinted 1965, 23 pp., il., 35¢, Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

Spittlebug Damage to Coastal Bermuda, by John C. French, Area Extension Entomologist, Leaflet No. 28, il., June 1965, Georgia Experiment Station, Experiment, Ga.

Tyler Corp., Benson, Minn., maker of fertilizer-handling equipment, has chosen Warren Jackson to manage its distribution in Western Canada.

Velsicol Chemical Corp., Chicago, Ill., recently appointed William H. Bricker to the newly created position of general manager for the company's Agricultural Chemicals Division.

Prescription Forests

(from page 23)

converted to new stands of more valuable trees by using pelleted herbicides around the undesirable trees. In his experiments, pelleted herbicides have killed "weed" trees without damaging newly planted seedlings.

Such undesirable species as white, red, and black oaks have been easily killed with the herbicide, fenuron. Others including hickory, dogwood, and ironwood are best controlled with granular dicamba or picloram.

The best practice, Dr. Shipman says, is to plant trees that will not be eaten by deer and rodents, are adapted to the site, and are valuable to the industry. He reports excellent results with Japanese larch, which in some cases grew more than 40 inches during the first year.

In an early attempt to convert forests to desirable trees, Dr. Shipman and associates planted two-year-old red and white pine seedlings among low-quality oaks and hickories. Undesirable hardwoods in the area were killed with pelleted herbicides scattered on the surface. However, deer and rodent damage to the seedling trees was severe. To reduce this type loss, the area was replanted with Japanese larch which is a species not preferred by deer or rodents. Dry, pelleted fenuron and granular dicamba herbicides were then applied to the soil surface by both grid and band methods, and at various concentrations.

First year results showed excellent seedling survival and growth with simultaneous killing of the competing hardwoods. Animal and herbicide damage to the seedling trees was slight.

Most pelleted and granular herbicides are nonvaporous and are low in toxicity to man, animals, and wildlife. When used according to the manufacturer's recommendations, they leave only slight soil and plant residues. And they are capable of being "tailored" to specific soil and plant cover conditions. Dr. Shipman worries however, that care should be taken to keep these herbicides from washing down onto crop lands.

Pelleted and granular chemicals need no costly equipment for applying. They can be used effectively to eradicate undesirable brush and trees in fields and forests, to improve watershed and wildlife habitats, to control brush along highway and utility rights-of-way, and in forage and pasture renovation.

Bermudagrass Kill Good On Highway Shoulders

Bermudagrass control on asphalt highway shoulders is feasible. Dr. Wayne G. McCully, Texas A&M University Range Science Department, has found any one of four chemicals to be effective. He has successfully used sodium TCA, Polyborchlorate, dalapon, and Borascu.

Sodium TCA is most often used, since Dr. McCully has found it effective for both prevention and control. The other three chemicals are recommended only in presurfacing as a prevention.

Bermudagrass is a problem on asphalt shoulders because it grows in cracks, creating seams and opening the asphalt-sealed shoulder to moisture. During cold periods the water freezes and the resulting expansion and contraction breaks up the asphalt base.

Once grass becomes a problem, sodium TCA sprayed on the shoulder will kill runners and sprouting seeds. Best time for application is spring, followed by a second treatment 30 days later. Effective application rate in the Texas tests proved to be 200 pounds of sodium TCA per acre.

Any of the four chemicals are effective as a control. Dr. McCully recommends that they be used just ahead of the prime coat during the asphalt paving process.

Dr. McCully's research was done cooperatively with the Texas Highway Department, Texas Transportation Institute at A&M, Texas Agricultural Experiment Station, and the U.S. Bureau of Public Roads.

Trimmings

Anyone For Lunch. Marsh grass, paper and algae may help solve the world food problem according to Agricultural Engineer Kenneth A. Harkness at The Ohio State University, Columbus. He says it's time we stopped thinking of agriculture only as corn, soybeans, beef and pork. For example, he says that 100 pounds of newspaper can theoretically yield 24 pounds of food protein, about the same as that in 135 pounds of hamburger. A plot of alfalfa fed to beef yields 80 pounds of food protein. If extracted directly from the plant, the same alfalfa would yield 2500 pounds or 30 times as much protein. Harkness says an essential link in making use of unusual plants may involve microorganisms, bacteria and fungi, to convert them into protein sources. And don't be concerned about eating microorganisms such as fungi and bacteria. Bread, cheese and beer are full of them. So, keep faith. We may find a better use for wood chips and turf clippings.

* * *

There Are Days. *Mrs. Samuel Awers came home to find her Milwaukee lawn being ripped apart by a hard-working bulldozer. "I almost dropped," she said. But Michael Conway of D-B Wrecking Co., who assigned his men to dig up a lawn on North 71st St., says his firm is replacing the turf.*

* * *

New Biological-Chemical Era. Without weed killers today, farm operators, sod growers and landscape contractors would be forced to move 600 billion tons of dirt by tillage each year. No longer are weed killers just disaster control agents, according to Dr. M. T. Goebel, Du Pont scientist. They are now essential tools of production.

* * *

Creeping Red Fescue. *We're happy to report full clearance for the Chewings Fescue and Creeping Red Fescue Commission, housed on the sixth floor of the Weatherly Building, Portland, Ore. Finding that they are simply another commodity commission fully authorized by the Oregon legislature should ease the minds of the good Oregon citizens.*

They'll be happy to find that "creeping red" does not connote anything which can be construed as subversive, that Chewings was named after Sir Thomas Chewings, a New Zealander who developed the strain. And that no one has any idea how the name "creeping red" came to be. Also, that creeping red fescue is more likely to be found in highly developed strains known as Pennlawn red, which again isn't red, or Rainier, or Illahee. Furthermore, Oregon has become a major producer and supplier of fescue turf seed. Seed is now a $6 million plus crop for the state with more than 30,000 acres being grown.

* * *

Tree Spraying Continues. Shorewood and West Milwaukee, Wis., are spraying with DDT to prevent Dutch elm disease. With a loss rate of only 1.7% last year, town trustees voted to spray despite fear of harm to wildlife.

WTT

Business Bible

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Any more questions?

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Cellulose & Protein Products Department, Hercules Incorporated, Wilmington, Delaware 19899

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