when your season rolls around...

be ready to roll with a NUnes sod harvester

With a NUnes Sod Harvester and three men you can lift, cut, roll and palletize up to 1200 square yards of sod per hour.

The harvester, developed at Cal-Turf Farms in California, is designed to handle any length of rolled or slabbed sod.

Field grading of sod is done by the tractor operator, who has clear visibility at all times.

Hydraulic controls permit quick and easy adjustment for all conditions.

The sod harvester travels alongside, never on the turf, during harvesting and can pick up and roll sod at any time your tractor can operate in your field.

Sod can be cut with any type of sod cutter. The long ribbons can then be lifted and cut to any desired length from 24" to 90", size depending on thickness of sod.

Loaded pallets can be spotted for later field removal and be clear of the next harvest run. If direct truck loading is desired, a conveyor extension is available.

The basic power train is a Ford LLG-2110 wheel tractor. The sod harvester can travel at speeds up to 17 MPH for quick transportation between plots.

The efficiency of this all-mechanical operation has been proven on Cal-Turf Farms in Patterson, California, and it can solve the problem of quick and economical harvesting of sod for all turf farmers.

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More smiles per acre

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HERBICIDES: Bandane® for crabgrass (and insect) control—Banvel® GS, and Banvel® 2,4-D for weed control. INSECTICIDES: Chlordane for insect (and crabgrass) control. FUNGICIDES: Velsicol® "2-1", Memmi® BEC, Thiban™ 75, Thiban-PMA, PMA 10, for disease control. FUMIGANTS: Pestmaster® Soil Fumigant-1 for greens renovation.

Write for Velsicol Turf Chemicals Catalog: Velsicol Chemical Corporation, 341 E. Ohio St., Chicago, Ill. 60611, Dept. GM
The Cover
Irrigation installation at new Calabasas Golf Course in Southern California was integral part of design of this $350,000 course. Automatic irrigation system is capable of irrigating entire 150-acre course within a 10-hour period. (See story on page 8).

WTT Mailbox
We are Honored
I am most impressed with your magazine. It is in my opinion, one of the best I have read relative to the horticultural field. The articles are clear and well written and the illustrations are excellent . . . inasmuch as I work with a cross-section of people in the country, a great many see and read your magazine. A magazine of value, such as WEEDS TREES AND TURF, is not made available everyday . . . and when one does appear on the market I feel people should be made aware of it.

Lawrence D. Stouse
Extension Horticultural Agent
Johnson County, Kansas

Thank You Mrs. Ensor
We certainly have received many favorable comments on the fine article you wrote on Green Valley Turf in the February issue of WEEDS TREES AND TURF. The cover picture is very beautiful and a very true color. The rest of the photography is excellent and very descriptive. We have had many inquiries and wonder if you could send us extra copies.

Mrs. K. C. Ensor
Green Valley Turf Co.
Littleton, Colorado

Certainly Sir
I was pleased to note the feature story on one of our members, the Smith Tree and Landscape Service, Lansing, Mich. . . . if possible, I would like to borrow the photos for our monthly newsletter . . .

Harry J. Lambeth
Executive Director
Associated Landscape Contractors of America, Inc.
Stop Weed Grasses with one stroke

...pre-emergence Pre-San® protects all season

One application of Mallinckrodt Pre-San, and you can forget about weed grasses for the entire season. That's important, because these pest grasses will start germinating in the weeks just ahead—and will continue to thrive right through every warm day into September. Long-lasting Pre-San nips them before they ever become an established plant.

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No weed grass grows where Pre-San goes . . . so call your Mallinckrodt distributor today.
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NEW FYLKING KENTUCKY BLUEGRASS

... rated "Best Obtainable" by noted authorities

From tee to home lawn, new 0217® Fylking unrolls an unexcelled carpet of turf that thrives!

PRODUCES TOUGH, LUSH-GREEN TURF FAST

0217® Fylking is a new, low-profile grass with unexcelled turf-forming qualities. Sod can be lifted in just 90 days! Vigorous rhizomes form a dense growth that crowds out weeds. Gaps and divots fill in quickly. 0217® Fylking greens up earlier, is more brilliant in color, stays greener longer.

EASIER TO MAINTAIN, SEASON AFTER SEASON

0217® Fylking has been tested for 10 years, from Canada to Mexico. Everywhere, it has received superior disease-resistance ratings. 0217® Fylking retains its luxuriant qualities in close cutting heights, in sun or shade. Count on 0217® Fylking to flourish every season, regardless of summer heat, drought or hard usage!

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

Credibility Gap?

Pesticide use continues to grow. We are in a period when the well-being of society depends on chemicals, both for food and non-crop uses. Yet public opinion is largely suspicious of the pesticide industry. Society generally believes a credibility gap exists in statements made to allay the fears of chemical use. More legislation and government regulations are demanded.

Yet pesticides today are efficient. Used according to label instructions, they constitute little hazard. Recommended rates coupled with safe handling can help improve the public attitude. But this is not enough.

More stringent methods are required. Manufacturers and formulators cannot be expected to bear the entire cost of a public relations program to educate the public. This is a job which requires effort by everyone in the industry. Every employee, regardless of his place in the peck order, must be made aware of the need to develop public understanding.

Employers can start this trend first by a company safety program. Safe storage and careful labeling of chemicals is a major step. Wall posters, placards which promote safe handling, and regular safety instructions to employees can prove helpful.

More important, however, is training of employees who either handle or use chemicals. They must understand the product, and its effect on either vegetation or insects. And they must know its effect on people. In the event of accident, they must know precisely how to administer first aid.

Employers, however, must extend their influence well beyond company personnel if the public attitude toward pesticides is to be improved. Of major importance is regular contact with local news people. Spray operators can do much to sell the value of chemicals in roadside beautification, clearing inland water, preserving street trees, and a myriad of other benefits which the public enjoys daily. These same operators are also in a position to point out that only pesticides found to be safe by careful research and registered for use by government are ever used.

Another step for employers will be active community participation in civic programs. Guest speakers who can discuss methods for improving city parks and highways are always in demand. Spray operators are fully capable of selling their industry. They must devote some time and real effort in this direction.

Society needs the information and the industry stands to benefit from greater public understanding.
Open burning of any kind is now prohibited in New York State. The state has passed an Anti Air Pollution ordinance which is being enforced.

At present, Municipalities are generally allowed to open burn on their respective dumps on a daily basis. However, they must cover the burned refuse with earth each day. This is a costly method of solid waste disposal. I can see it for garbage and general refuse, but not for leaves, wood, or brush.

Government constantly seeks to improve the living conditions of everyone. In my present position as Majority Leader of the Dutchess County Board of Representatives, and in past public positions, I, along with my colleagues who also serve, recognize this fact. But we are also aware that there has to be a point where simple economics must be reckoned with. Our goal is to eliminate air pollution insofar as possible. At the same time we cannot agree to a major expenditure of money and effort which does very little to create clean air.

As an operator of a tree service business, I face rising costs. These costs must be passed on to the customer. Removing wood and brush other than by burning when working in rural areas and along utility rights-of-way is very costly. It means that we must charge the utility companies more for the work. They in turn must pass this extra cost on to customers. Customers continue to pay more and more for the goods and services they buy.

Elm trees along highways and on private property are a major concern at this time. Eliminating burning in New York State has both raised the handling cost of these, and has contributed to the spread of Dutch elm disease. Wood which was formerly burned is now left along rights-of-way or relegated to a Town dump where it becomes a prime breeding place for the carrier of this disease, the elm bark beetle.

Accumulations of leaves on home lawns presents a removal cost. It is fine to suggest that they be used for compost heaps, but few town residents know how to handle these. Nor do they need them. If the Town removes leaves, operation costs of Town maintenance increase. This extra expense must be met by new taxes. For myself, I personally mourn the passing of the pungent odor of burning leaves. To me, it was one of the pleasant experiences of our crisp fall season. It has been replaced by the soggy leaf problem. Many citizens who cannot or will not bear the expense of removal let them accumulate in gutters or in unsightly piles.

State highway jobs which are let for bid, now have an added cost factor. Rather than burning brush on cleared land, it is now necessary to load such material onto trucks for removal. Brush refuse has to be trucked to some dumping area or ravine and covered. Result is higher costs of highway construction which are passed on to the taxpayer.

At the same time that such added costs are being passed on to the taxpayer, legislators who passed the Anti Air Pollution ordinance are telling constituents back home that they are taking “a long, hard look” at the problem of rising costs. In my opinion, unless we graduate from the “long, hard look” to the “short, sensible action” we will have further increased costs.

In summary, I believe that the idea behind the anti pollution program is commendable, both in New York State and across the nation. If we don't take steps to purify the air we breathe, we may suffer lung ailments and other types of associated illnesses. But since motor vehicles and industrial stack wastes contribute many of the known pollutants, and certainly the most toxic materials, I feel that there is much to be done before we worry about wood, brush, and leaf burning.

My opinion is that burning of wood, brush, and leaves in a sensible manner should be permitted. By the time wood smoke is dissipated into the air, its pollutant effect is only a tiny fraction of the total air pollution problem. Its toxic effect on the lungs of the citizenry is infinitesimal when compared to the smoke inhaled into the lungs by cigarette smoking.

(Editors note: Mr. Bartles formerly served as Supervisor of the Town of Hyde Park, N. Y., and is presently serving as Majority Leader of the Dutchess County Board of Representatives. This board has recently passed a resolution asking the state to rescind that section of the ordinance which prohibits burning of leaves, wood, and brush. WEEDS TREES AND TURF carries this editorial because of the industry’s need to remain alert to this type of restrictive legislation.)
GOLFERS hitting into the rough at Calabasas Golf Course in Southern California should keep a look-out for Cowboys, Indians or possibly even Robin Hood and his Merry Men.

The Calabasas Golf Course, scheduled to open in early summer this year, is located on the scenic, 3000-acre Warner Brothers Studio Ranch. The former filming locale of many westerns and swashbuckling Robin Hood adventures, now called Calabasas Park, is nestled in the Santa Monica Mountains north of Los Angeles.

Today’s Men of the West, designers, contractors and irrigation experts have transformed 150 acres of native Calabasas Park scenery into a gourd-green championship golf course.

The course, part of a large development of fine homes and recreational facilities is a project of Calabasas Park Company, a partnership of Associated Southern Investments and Bechtel International.

It was constructed on rolling hills covered with virgin vegetation that included holly oak, white oak, mesquite, thistle, poison oak and a great deal of rock.

The native ground cover is picturesque from a distance, but comes-up lacking as a championship golf course fairway. A major objective of the course designer Robert Trent Jones, Inc. Palo Alto, Calif., was to retain
Railroad sidings (1) and security fences (2) are among the many locations where you can control unsightly vegetation with Du Pont "Hyvar" X and "Hyvar" X-WS. Take advantage of this great profit opportunity by basing your weed control service on these Du Pont herbicides. Other locations in and around a typical plant where they can stop potential trouble are warehouses (3) tank areas (4) pipelines (5) ditches and roadsides (6) parking lots (7) storage areas (8) signs (9) around buildings (10) loading docks (11).

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You can make custom weed control jobs easy, effective, and more profitable with Du Pont "Hyvar" X, "Hyvar" X-WS, or products containing bromacil. These time-proven, dependable herbicides can help you offer weed control service that stops equipment losses, protects inventories, reduces fire hazards, increases operating efficiency, and keeps up "the good housekeeping look."

Expand your business, offer your customers an effective, low-cost, weed-free season based on dependable products. For more information on these economical weed killers, clip and mail the coupon today.

With any chemical, follow labeling instructions and warnings carefully.

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Address________________________
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Better things for better living...through chemistry
the wild-west flavor and beauty of the surroundings, while creating a controlled beauty of fairways, greens, tees and roughs.

Irrigation technology played a highly important part in the development of the construction plan and the ultimate maintenance plan for the course.

**Course Can Be Irrigated In 10-Hour Period**

The irrigation system for the 6,600 yard par 72 course was designed by Robert Trent Jones Irrigation Consultant John A. McPherson. His ultimate irrigation objective was to have a system capable of automatically irrigating the complete 150-acre course within a single 10-hour period.

Intermediate steps along the way called for planned stages of installation of the irrigation system so that germination of the turf could be handled by quarters of the course at a time.

The complex contract, which totaled more than $350,000 was concluded successfully through careful advance planning and continual communication between McPherson, Lowe Hydro of La Habra, Calif., the irrigation contractor-installer, and the major equipment supplier Buckner Sprinkler Company of Fresno, California.

Following rough and final grading, a total of five miles of transite main line 6 inches in diameter was trenched in. These traverse the course and run to the pumping station. The station is capable of supplying 1800 cpm from three 550 gpm pumps and one 150 gpm pump. The pumping units operate on a pressure call or demand system, and are fed from two lakes constructed on the golf course. The system operates at 150 psi.

Water is supplied by a 16-inch main from the Los Virgenes water district to the two lakes. The water supply is automatically controlled to keep a constant lake elevation, an approximate 3 million gallon reservoir.

From the main lines, 15 miles of lateral line pvc pipe were pulled into place by Lowe Hydro crews using a vibratory plow.
What is there to weed control besides just killing weeds?

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

Could be the area is large. Or small. It may be easily accessible. Or it might be difficult to reach, either with sprays or big equipment.

These, as well as moisture availability and soil type, are just some of the conditions you have to consider before selecting a herbicide.

But whatever the weed problem, you’ll find the right answer in one of the five Geigy industrial herbicides. Why? With them, you can solve just about any weed problem you might encounter.

What’s more, each Geigy industrial herbicide delivers long-lasting residual control with once-a-year application. So they’re most economical, too.

Geigy herbicides are easy to handle and apply. They require no special protective clothing or devices and can be applied through most application equipment.

For spraying, you can use Atrazine 80W or Simazine 80W wettable powders, or Pramitol® 25E emulsifiable solution. Where spraying is impractical, you can apply dry Pramitol® 5P or Atratol™ 8P pellets, by hand or mechanical means.

Find out more on how these Geigy industrial herbicides can solve practically all your weed problems . . . effectively and economically.

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Geigy Agricultural Chemicals, Division of Geigy Chemical Corporation, Saw Mill River Road, Ardsley, New York 10502.

CREATORS OF CHEMICALS FOR MODERN AGRICULTURE
the sand. The greens were planted with Penncross bent grass.

On the fairways the turf was stolonized with Tifway #419 hybrid bermuda and the roughs were seeded with Kentucky blue grass applied in a slurry mixture. The erosion banks were also seeded with the slurry technique.

Germination of the planted turf was an early test of the irrigation system and started June 4, 1967. This crucial period extended through late August. The stolonized turf required roughly 4 times the normal amount of water to maintain an existing turf, and the dependability of the Buckner system proved itself in the resulting turf.

On greens and tees, periodic misting of the areas proved most successful according to Superintendent Little. The system was set to operate during all the summer daylight hours. Little chose to irrigate 2 minutes per hour each day through the germination time, and has reaped a gourd-green, healthy turf from his precisely controlled irrigation.

After the course is open for play, the adaptability of the Buckner Irrigation System will be extremely valuable again, according to Little. Quick economical adjustment of irrigation control can be made easily to meet watering requirements of the course according to the amount of play it receives, mowing schedules and the quality of play. Initial plans call for watering greens every night and fairways every other night.

Trees were planted throughout the course from existing trees on the property. There were many conifers — some 25 feet high—and some were a backdrop for Robin Hood in the films of yesterday.

Nursery trees, eucalyptus, flowering plum, liquid amber, and varieties of oak were also planted as part of the overall landscape design. Along with the lush fairways, greens, tees and roughs they create a green carpet that reaches to rugged background hills. Calabasas Golf Course is truly a magnificent example of the results of combined expert design, irrigation and installation technology in the west.
Irrigation Roundup
tips from specialists in the field
to 3000 golf course superintendents
at the GCSAA 39th International
Turfgrass Conference and Show

Cost Analysis:
Garold M. (Jerry) Murphy, superintendent, Somerset Country Club, St. Paul, Minn., reported on the 1967 conversion of a quick coupling system at his club to an automatic Toro Vari-time satellite system.

For GCSAA members, he presented an analysis of the costs and general operating experiences with the new system. His own time in operating the new system requires 5 to 10 minutes once or twice weekly. This is spent adjusting the master controller to adapt to changes in weather and spot checking of satellite control dials.

Sprinklers for the system are gear driven and make the complete revolution in 3 minutes. This, Murphy pointed out, is adequate for relief of stress under the Somerset course conditions. This also permits timing syringing to suit play and results in minimum interference with golfers.

Operating costs presented in the table include electricity and lubricant for the pump and gas and lubricant for the patrol vehicle. It does not include repair or depreciation. Cost for the 2 systems is comparable. The slight difference in favor of the automatic system probably is valid, since night watering can be completed in 12 hours as compared to the 14 hours formerly needed with the quick coupling system. Major operating cost, Murphy said, is for electricity.

Some cost benefits of the automatic system are difficult to assign a monetary value, Murphy reported, but they do exist. He enumerates them as turf benefits and as people benefits. He suggested that superintendents might assign their own dollar value to these (Tables II and III).

In general, Murphy said, the savings in labor and operating costs are significant and impres-

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<th>Table 1. Cost of Operation—Quick Coupling Vs. Automatic.</th>
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<th>Three Months’ Totals</th>
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<tr>
<td>Quick Coupling</td>
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<td>Savings</td>
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<th>Table 2. Turfgrass Management Benefits—Favoring Automatic.</th>
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<td>1. More efficient use of water.</td>
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<td>2. Precise control of water.</td>
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<td>5. Less wear and tear on turfgrass.</td>
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<td>6. Easy to remove dew and frost.</td>
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<td>7. Easy to water in fertilizer.</td>
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<td>8. Less down time associated with sprinkler repair.</td>
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Table 3. People Benefits—Favoring Automatic.

1. Golfer satisfaction.
2. Happier crew—no one assigned night duty.
3. Smaller more efficient crew.
4. Less vandalism.
5. Shop is locked at night.
6. More favorable comments on condition of golf course.
7. Peace of mind—Superintendent.

Irrigation System Design:

Chances are, when you invest in an automatic irrigation system you are going to pay the same price as a good, well planned system would cost. Why not insures that you will get what you pay for? This is the opinion of Richard R. Abernethy, Telsco Industries, Dallas, Tex.

Abernethy, in presenting the official GCSAA Golf Course Irrigation questionnaire to GCSAA members for help in planning and designing custom irrigation systems said that the trend today is toward “turnkey” design and installation. This type system, he said, is done by competent, specialized golf course contractors. Such firms today are well capitalized, employ engineering personnel for both design and construction supervision, and have the specialized equipment to do the job right.

Tremendous responsibilities are placed on the superintendent by members and directors for the success of a system which is a major investment. Abernethy points to the questionnaire as a means of covering, in practical language, all the major areas necessary for the irrigation designer to prepare an authentic, accurate and practical estimate of individual irrigation needs.

No one knows the course better than the superintendent, Abernethy implied. He pointed out that water requirements vary from one geographical area to another. Fairways, greens and tees require special consideration, especially for drainage and wind problems. Only the superintendent knows how often the course requires hand or supplementary manual watering. Thus, he believes that the questionnaire provides the “common denominator” which will enable the superintendent to (1) better evaluate the job, (2) communicate the facts to the decision making administration, and (3) better understand the finished product or design when the final plans are presented for approval.

This approach, Abernethy said, can save money.

Primary Decision Making:

Engineer Don A. Hogan, D. A. Hogan & Associates, Seattle, Wash., presented the 3 common approaches to the problem of golf course irrigation design and installation and the problems associated with each. First, Hogan said, is the “package deal” or the “turnkey job.” This is attractive, but Hogan pointed out, leaves the club somewhat vulnerable because the seller determines amount and quality of work and material, while the owner does...
Chinch bugs don't stand a chance when you hit them with Ethion. Ounce-for-ounce, no other pesticide can match its Chinch-killing power.

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Write for new catalog.

not have an experienced person protecting his interests. Normally, design and materials are limited to a single representation. And, Hogan said, it is not probable that architectural professional ethics can be completely divorced from the influence or effect of the contract profit aspects.

The second approach is the combination of design and materials supplied by one firm and a separate contract for installation, or where the owner installs the system. This method, according to Hogan is normally less costly. Here, again, he said, lack of construction coordination may result unless the owner has an unbiased, experienced representative to supervise and coordinate the project. The term "design" as applied usually covers only a simple drawing or layout. Other engineering requirements must be performed in conjunction with the basic layout.

The 3rd approach by Hogan was the professionally designed system by a qualified engineering firm, combined with the installation being performed by the successful bidding contractor. In this case, the contractor's work is supervised and inspected by the engineering firm who represents and protects the interests of the owner. Hogan, an experienced engineer in the business, believes a private engineering firm paid directly by the owner is the best arrangement.

The team approach, in the belief of Hogan, can result in the most satisfactory system. He lists team members as follows: (1) club committee, (2) golf course superintendent, (3) professional designer, (4) installation contractor, and (5) material suppliers.

Each member group on the team needs specific qualifications and has definite responsibilities, Hogan said. The club committee is first. This group needs to be dedicated and willing to devote time and effort. They must work directly with the golf course superintendent and engineer.

The golf course superintendent is a vital team member. His knowledge of the course and turf management will influence the type of system to be approved. He must present operating costs in conjunction with the engineer, work out completion schedules, and see that future plans of the course are in line with the new system, plus a myriad of other details which must be coordinated with the entire team.

The 3rd member of the team, the professional designer, must work closely with the club committee and superintendent in a detailed design. This will include all construction details and specifications, prepared for bidding and construction control purposes. He must screen bids, approve materials, monitor construction work, and perform necessary tests, in detail, of the installed system. Finally, upon completion, he must certify the installation and furnish operating instructions and "as-built" drawings.

Job of the contractor as a team member is to install the system in a workmanship manner in complete accordance with the specifications. He must use quality materials and equipment, and supervise the project, at the same time working closely with the superintendent to familiarize him with operation and maintenance.

Material suppliers must provide data on materials and equipment, assist the contractors in bidding, coordinate delivery of materials, instruct the construction crew, assist in final adjustment and testing, and generally service their products.

Because of the magnitude of the modern irrigation system, Hogan pointed out that it warrants the best possible development. It is a serious mistake, he said, to settle for less.
Tree Planting Review

check list for new employees

Tree Care men have to answer lots of questions. During tree planting operations, passersby and buyers become literal sidewalk superintendents. Questions as to why medium-sized and dwarf species are best for streets and ranch-type homes need answers. This is good for the industry.

At the same time, the tree man must be prepared to astutely discount the value of old, favored, but less desirable trees. For example, he must explain why Chinese and Siberian elms, poplars, willows, silver maple, boxelder, and others are not suitable. Though fast growing, they are relatively short-lived. Also, their brittle wood is susceptible to storm damage, roots invade underground pipes, and they are subject to pest and disease attack. A learned explanation assures the onlooker and promotes the professional care business.

Further, careful planting can build business. It does much to increase the percentage of trees which survive a move. This is especially true of wilding trees. Nursery stock is usually much easier to handle. Most tree men prefer nursery stock, either that grown by themselves or purchased from a reputable operator. Nurseries generally offer a large selection of sizes and species. When compared to wilding trees, the nursery trees will have better root and crown systems, will become established more quickly, and are more likely to live.

When wilding trees are used, they need to be dug in open rath-
Functional Tree Parts

A. Crown. With sunlight these convert carbon dioxide from the air plus "raw" sap into useable food.

B. Leaves. Composed of a thin, continuous layer of cells. Produces new wood and bark.

C. Pith. Located at very center of trunk. Composed of tissue which is produced at the growing point of the elongating stem.

D. Trunk. Provides mechanical support for crown and transports water and nutrients plus storing food manufactured in leaves.

E. Heartwood. Composed of dead cells and main function is support.

F. Sapwood (xylem). Conducts "raw" sap from roots to leaves. Consists of both living and dead cells.

G. Cambium. Located between sapwood and inner bark or phloem. Produces new wood and bark.

H. Inner bark (phloem). Conducts useable food from leaves to the cambium to nourish tree or to storage areas in the wood.

I. Medullary rays. These store food and conduct water and food laterally.

J. Outer bark. Composed of dead cells. Insulates and protects inner tissues from disease, infections, and drying.

K. Roots and hair roots. Hair roots absorb water and mineral salts from soil. Larger roots anchor tree and store nitrogen and carbohydrates.

L. Large Trees Can Be Successfully Transplanted

For even larger trees, those with basal trunks of more than 3 inches, root-prune for 2 years and move the 3rd year. In the first year, root-prune only part of the way around the trunk. Do the final root-pruning the 2nd year and then move the tree the next season. Though this is seldom practical, it is safest and will pay dividends in livability.

Evergreens are dug the same as hardwoods, making full use of the soil ball. However, evergreens need not necessarily be root-pruned prior to digging. When moving trees with a soil ball, work burlap well up and around the ball. Tie the burlap at the top of the ball so that it holds the soil securely in place.

Hardwoods may also be dug with roots bare. When this is to be done, dig around the tree carefully and cut the roots. Use a spading fork to loosen soil. Do this by gradually working the soil away from the roots. Start at the outer edge where the cut has been made and work toward the tree. In moving trees with bare roots, place peat moss and burlap around the root system. In all cases, keep roots moist until planted.

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before the buds break. Trees are also easily moved during fall months, from leaf-coloring until freezing weather.

Once dug, trees need to be planted as soon as possible. When stock cannot be planted immediately, it needs to be heeled in by setting roots or soil ball in a hole, covered firmly with soil and kept moist.

Planting sites are important. Street trees do best when planted inside the sidewalk, rather than between walk and curb. The exception to this, of course, is when there is a wide area available between walk and curb.

Before planting, carefully consider the size of the fully matured tree. Trees need to be set 30 feet from structures and 50 feet apart. Make the hole deep enough and with sufficient width to receive the root ball without crowding roots. It is wise to dig a larger hole than needed and to refill excess space with a mixture of well-rotted manure, compost or peat moss, and rich loam. Trees need to be set about 2 inches deeper than they were in their original site.

When planting, remove burlap from ball or lay it flat in the hole. Spread all roots in a natural position. When this is not done, girdling roots may result and kill the tree. Jagged, broken, or badly injured roots need to be cleanly cut above the injury. Save as many small, fibrous roots as possible. Fill the hole in steps with a mixture of soil, rotted manure or peat moss. Tamp slightly and water as more fill is added. This forces soil around the roots and prevents air pockets. Leave a small depression around the tree to catch as much water as possible.

Stake the tree with loops which are attached loosely. Canvas or other pliable material such as a section of rubber hose works well. Do not use anything which will injure the bark. Commercial loops can be purchased. Also, a recheck to see that stakes are holding the tree in a rigid position is worthwhile. Water as conditions warrant.

In the case of hot or particularly drying weather, the prepared anti-drying mixtures or waxes may prove profitable. These permit the tree to become established without too much drying out.

Hardwoods Need To Be Pruned Before Planting

Top-pruning is a must for hardwood (deciduous) trees. This offsets root loss which results from digging and moving. Nursery trees, because they have been root-pruned prior to digging, need less pruning than wilding trees which are dug and immediately planted.

Pruning needs to be distributed over the tree rather than just removing the ends of all limbs or removing all the branches on the lower half or third of the tree. Remove interfering limbs. Space limb crotches so that plenty of space is left for each remaining limb. Cuts should be flush for rapid healing of pruning wounds. Never cut back the leader unless one of the laterals in the top whorl is also removed. Otherwise, an undesirable forked tree will result.

Evergreens are seldom pruned except when root loss is severe. In such cases, remove some of the past year's lateral growth. Do not prune off entire limbs on evergreens or the natural form of the tree will be destroyed.

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 planting and care of shade trees and supplied by Maine State Entomologist Robley W. Nash, Augusta.
Mechanical Renovation
One Method For Upgrading Turf

By Robert W. Schery
Director, The Lawn Institute, Marysville, Ohio

EARLY spring and autumn are two times of the year when something can be done about upgrading the lawn through introduction of choice varieties. Since a cultivated seedbed gives a new seeding its best chance, results are surest if the old lawn is plowed up, with unwanted vegetation perhaps first knocked out by arsonate or paraquat. Especially prized turfs, such as a golf green, may merit the expense of soil sterilization, as with methyl bromide.

But not everyone cares to invest in so complete a renovation, especially in spring when a badly disturbed lawn would hardly complement freshly budded ornamentals. Instead mechanical treatment of the old turf might offer a less drastic, inexpensive approach. It provides something of a seedbed for new seed at the same time that it sets back weedy growth in the old sod.

Some reports suggest that coarse bunchgrasses such as tall fescue may be repressed while rhizoming grasses such as Kentucky bluegrass and the fine-leaved fescues gain ground, following severe mechanical attrition of a mixed sod. Fresh sprouts from rhiomes are only a few days in appearing, and if adequate moisture prevails bolster seeding is not much longer in getting started. Maceration of the bunchgrass yields space to competing species, and should reduce stooling of the clumps. It is well to have completed mechanical renovation before the soil warms enough for crabgrass to germinate, or else a suitable crabgrass preventer should be used, (products containing siduron can be used at the same time Kentucky bluegrass, fine fescue and Highland bentgrass are seeded, but not with bermudagrass).

Variety In Equipment

A number of machines useful in mechanical renovation are on the market. Aerifiers designed to loosen soil by punching holes have only limited usefulness, but the so-called vertical mowers for thinning, set deep enough to reach the soil, really stir things up. The intensity of treatment can be varied with the weedingness of the turf. Most machines have the vertical slicing discs spaced about an inch, and thus make striations this distance apart when used one time over. If you want to really chew up the surface of the old lawn, mow vertically several times in various directions.

At least one machine on the market has three interchangeable reels for differing objectives. Besides the typical vertical slicing blades, there are flexible tines to comb thatch gently out of erect grasses such as Kentucky bluegrass and fine fescue with a minimum of bruising. And for a severe bludgeoning of the old sod, flails much like a hammermill literally beat the vegetation to pieces. Where the lawn is little else than coarse grass clumps the flail might be used first, possibly followed by soil slicing to provide lodging sites for new seed.

Of course there is no guarantee that the varieties newly provided by overseeding will gain the upper hand or even prosper. But at least you will have introduced select grass with the possibility of upgrading the lawn. Mechanical renovation certainly affords seed a better chance for gaining a toehold than if simply cast upon untreated turf. And in breaking up whatever thatch there may have been, fertilization is made more efficient. The granules are thus more easily accessible to soil and rootzone.

Tailored Grasses

Incidentally, there are many new varieties of fine turfgrass, often tailored for a particular kind of performance. Fylking 0217 brand, low-growing bluegrass out of Scandinavia, is first becoming available in quantity this year; it may prove useful as a companion for Colonial bentgrass in closely mowed fairways and for disease-resistant sod. Where well adapted, Merion still reigns as queen of bluegrass varieties, although, like Windsor, it suffers stripe smut in certain regions. Old-line natural bluegrass from Kentucky is now certified as Kenblue, while Arboretum is a similar mixed population out of Missouri. Park, famed for fast-sprouting is a composite from Minnesota. Prato is another attractive European selection while Newport and Cougar are workhorse varieties originated in our own Northwest.

There are new lawn fescues, too, Chewings, Illahee, Pennlawn and Rainier being joined by Highlight, Oasis, and others. Seeded bentgrasses are rather few, with Penncross the favorite creeping type, and Highland the most used of the Colonials (Astoria and Exeter are other recognized names). Kingstown is a velvet bent for meticulously kept speciality turf. These are but a few of the specially bred fine turf possibilities your seedsmen might recommend for introducing new blood into the lawn during its mechanical renovation.
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Reverse them to double their life. Knives can be resharpened individually. Does a better mowing job than a cutterbar mower even with dull knives. Cutting height is adjustable from $\frac{3}{4}$ to 5 inches.

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**Safe tractor.** New 2444 has great sidehill stability. A low center of gravity. A low profile. Big, wide grass tires. A differential lock reduces wheel spin, turf gouging, tractor drifting. 8.5-foot turning radius with 70-inch wheelbase and easy hydrostatic power steering. **Safe flail mower.** Knife action throws debris straight to the ground, not out. Rugged rubber (not canvas) safety shield won’t rot, rip, shred. For added safety, the universal joint is shielded.

**Thrifty team!** Choose your transmission. Standard hi-lo with 8 speeds forward, 2 reverse. Or optional 8 and 8. And save on mower maintenance. One man can change any flail blade individually without removing every knife in the row. See your dealer for additional worth-more features and an International 2444 tractor demonstration—with a 5 or 7-foot 70 flail mower. His finance plan can help you write this new equipment into the budget.
Few conventions match the spectacular staged by golf superintendents at the San Francisco Hilton, Feb. 18-23. Even fewer give their members as complete exposure to new methods and equipment at these annual events as does the Golf Course Superintendents Association of America.

Meeting for their 39th International Turfgrass Conference and Show, members needed to cover some 42,000 square feet of floor space in order to visit the 258 exhibit booths plus the meeting sessions. Practically every type of equipment available for turf care and golf course maintenance was on display. Conference sessions featured leaders in the field and offered the equal of a comprehensive course in course management for benefit of the delegation of almost 3000.

Program Moderator Dr. Marvin H. Ferguson, Mid-Continent Director, USGA Green Section, opens afternoon session.

9 Million Golfers In '67

Trends in the business proved a highlight of both formal and hallway sessions. Colonel Harry C. Eckhoff, facility development consultant, National Golf Foundation, in discussing these trends said that an interesting golf course is now considered an integral part of newly planned communities.

Eckhoff reported that 9 million persons in the nation now play the 9000 existing courses. Further, golfers are increasing at a rate of 10% yearly. Estimated cost to maintain the nation's golf courses last year amounted to $245 million. But golf related expenditures of such items as equipment, apparel, refreshments, and other items of cost makes golf spending a billion dollar business.

Public courses comprise only 14% of the total courses in the country. But these public courses receive about 40% of the total golf play. Semi-private courses account of 35% of the play and the remaining 25% play is on private country club courses. Eckhoff reported that play on many 18-hole public courses averages 250 to 300 rounds every
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day during the season. Play is booming with the big increase coming from women and junior golfers.

Despite a growth in facilities, Eckhoff said that courses are becoming more crowded each year. A total of 437 golf facilities were opened for play in 1967. These included 276 new regulation length courses. 114 additions to regulation length courses, 40 new par-3 layouts, and 5 additions to par-3's. Leading states in new facility development were: California, 39; Pennsylvania, 27; Ohio, 26; New York, 25; Michigan, 24; Florida, 22; and Texas, 17.

New Junior Courses

Of interest was the opening of 2 junior courses. The Lincoln Junior Golf Course, a 9-hole par-3 municipal operation was opened at Lincoln, Neb., by the city's Park and Recreation Department at a cost of $58,000. A 4-hole, 335 yard layout for children only was also opened at Bangor, Me. Three other known junior courses, at Minneapolis, Minn., Syracuse, N.Y., and Hershey, Pa., are in operation.

Both new course openings and facility starts were down in 1967, Eckhoff said, largely because of a shortage of available mortgage money at reasonable rates. With an easing of the money market, Eckhoff indicated that this downward trend will shortly reverse itself. Golf, he said, continues to attract players from every economic level. It is a sport played by persons of all ages throughout their lifetimes. Further, he said, golf facilities benefit a community in many ways. Civic pride is stimulated, new business created, open space increases property values, new industry is attracted, and healthful recreation is provided.

Trees require the same good management for growth which is needed for turf. Carl F. Whitcomb, horticulturist at the University of Florida, Gainesville, told superintendents that experiments at the Florida Station showed that trees and turf can be grown together successfully if managed properly.

Turfgrass, Whitcomb said, when maintained in a healthy state is a vigorous competitor. It can successfully compete with weeds, and can compete as well with trees, to the detriment of the trees, unless steps are taken to select the right type trees and then protect them.

Whitcomb reported that Florida tests showed that established bluegrass was not hurt by tree competition when light, water, and nutrients were adequate. Foliar growth, stand density, and root development proved normal.

However, the bluegrass did influence tree root development. Shallow rooted trees such as silver maple suffered from grass competition. Honey-locust, a deep rooted tree did not. Whitcomb listed other shallow rooted trees such as sweet gum, cottonwood, willow, and Australian-pine which should not be planted near greens or tees. If they survive, they will eventually create severe root problems. Deep rooted trees such as the honey-locust and Kentucky coffee tree are less likely to cause a maintenance problem.

Customer Service Important

Manufacturers today expect and encourage customers to use warranty services. So, Thomas E. Ames, manager of field service for Toro Manufacturing, Minneapolis, Minn., told superintendents. Makers of equipment, he said, like to have problems taken care of early. This is important from the standpoint of customer satisfaction and as a product indicator to the manufacturer. Ames listed the following services to which a customer is entitled after purchase: (1) services of a competent company specialist; (2) analysis of a customer's production goals, labor, and operating problems; (3) willingness to demonstrate; (4) pre-delivery assembly and adjustment; (5) post-delivery field adjustment and instruction; (6) responsibility for satisfactory performance; (8) an adequately equipped repair shop staffed with factory-trained personnel; and (9) periodic service after expiration of the warranty on the customer's expense.

Your Front Door

The friendliest gesture man can extend is an invitation to enter the "front door." This is the thinking of Warren Bidwell, golf course superintendent at the Philadelphia Country Club, Gladwyne, Pa. Speaking to the group, Bidwell pointed out, the moment a member or daily fee player enters club property, he should feel that he has just entered the front door of your club. Literally speaking, Bidwell told superintendents, your members should feel your very presence as though you are there to greet him personally. "This is done by your handiwork of fine grooming and finesse," he said. Here, Bidwell was referring to the entrance to the club, the actual setting of the clubhouse, and the grounds that surround it. This should make the so-called entrance hall appear as a classic piece of landscape architecture for the game of golf, and for all the other recreation facilities found at the modern day club.

Landscaping architecture, Bidwell believes, should be likened to a giant mirror that ultimately reflects the personality of the superintendent. If used properly, it can serve as an introduction to the individual member. The "front door," Bidwell said, can be a great image builder for the superintendent. A good job of projecting this image can remind members that the superintendent is responsible for the beauty and enjoyment which members receive at the club.
Determine Nitrogen Use Carefully In Tree Care

Nitrogen is the most important element in a "complete fertilizer" when determining fertilizer cost and rate of application.

Of the three basic components in a "complete fertilizer," nitrogen is the most expensive and has the greatest potential for burning a plant. It is, however, used in the greatest quantities and is the element to which woody plants respond most.

Jack Winkle, Davey Tree Expert Co., Kent, O., says that application rate of a "complete fertilizer" should be established on the number of actual nitrogen per unit area. It should not be based on amount per plant or inch of trunk area. This might cause damage to smaller plants or plants in areas where the root system is confined.

Winkle suggests an annual use of 4 to 6 pounds of nitrogen (from a high nitrogen fertilizer) per 1,000 square feet. This should be divided into 1 to 2 applications for trees, 2 to 3 for shrubs, and 3 to 4 for non-woody plants. If a woody low nitrogen mulch is used, such as sawdust or wood chips, the annual rate of nitrogen should be doubled.

On the practice of fertilizing trees and shrubs at planting time, Winkle reports he has not found concrete experimental data to support doing this. He suggests, only, that 3 to 5 pounds of super phosphate per 100 square feet be mixed with planting soil or back fill. Nitrogen or potassium should not be added until 6 to 8 weeks after planting.

Winkle presents four reasons for properly fertilizing landscape plants. They are: improvement of plant growth and vigor resulting in less dieback, more roots and more and darker green foliage; reduction of drought damage because of reduction in water requirement; reduction of disease damage due to increased resistance to disease pathogens and insects which attack unhealthy tissues; and reduction of winter injury. An excess of fertilizer can increase damage.

Turf Care Now Ranks 2nd in Pa. Agri. Business

Turfgrass has become a $164 million business in Pennsylvania. According to a recent survey, turfgrass is now the second largest agricultural enterprise in the state.

Money, according to the survey, was spent to establish and maintain new turf areas. It included costs for hired labor, seed, sod, lime, fertilizer, irrigation equipment, and chemicals for control of weeds, insects and diseases.

H. Burton Musser, executive secretary of the Pennsylvania Turfgrass Council, says the survey, by the State Department of Agriculture, showed the turfgrass industry second only to the dairy industry.

Musser says golf course managers are the only turf specialists who make adequate use of chemical weed control. Neither herbicides nor fertilizers are used to their fullest benefit by most homeowners, Musser said.

The survey showed fertilizer costs for Pennsylvania home lawns to be $5 million. Musser claims it would cost $26 million annually to supply the minimum amount of fertilizer needed to maintain the turfgrass in good condition.

The survey also showed golf courses spent about $14 per acre annually on weed control. The average for other areas like parks and home lawns was only $1.60 on a per acre basis. Expenses were low for use of both insecticides and fungicides on general turf areas, including home lawns.

WEEDS TREES AND TURF, April, 1968
State Imports Flea Beetle For Alligator Weed Control

A voracious little bug imported from South America has been credited with clearing an obnoxious stream-clogging weed from a Florida river.

The bug is a flea beetle, a tiny insect which feeds rapidly and exclusively on alligator weed, one of several plants which plague Florida lakes and streams.

The flea beetle is about the size of a common ladybug. It devoured almost all alligator weed along a 45 to 50-mile stretch of the Peace River in Florida’s Polk and Hardee counties.

Forrest Ware, fishery biologist for the Florida Game and Freshwater Fish Commission, said the weed had spread across as much as two-thirds of the river’s width as recently as last spring.

“It’s very impressive,” Ware said. “The flea beetle hasn’t been 100 percent effective in all areas in which it has been tried, but it sure has worked in the Peace River.”

The insects were brought into the United States by biologists involved in aquatic weed control programs of the U.S. Army Corps of Engineers.

After careful screening and testing by the Corps as well as the USDA to make sure insects were damaging only alligator weed, colonies were released at several weed-infested locations.

One was Lake Parker at Lakeland, in central Florida, where flea beetles were turned loose on unwanted aquatic growth during the spring and summer of 1966.

Last spring, Ware was placed in charge of a program designed to restore the Peace River from damages brought about by pollution from a slimepond break at a phosphate plant.

“That’s when we saw the lush growth of alligator weed,” he said. “Then, later, we saw the foliage turning brown. We investigated and found flea beetles were eating it.”

Ware said he surmises the insects migrated south to the Peace from Lake Parker. None had been released directly on the river.

The biologist said alligator weed had previously been very difficult to control. Chemicals provided the primary method of attack.

The plant takes root anywhere from the edge of a lake or stream to a depth of about two feet. Stems grow to the surface and then move horizontally, intertwining to form a thick, almost impenetrable mat.

The plant breathes through growth extending some 12 to 18 inches above the water surface, and this is where the flea beetle comes in. He and his mates completely devour everything above water. The plant, in effect, drowns.

There has been no evidence anywhere in Florida to indicate the insect is attracted to or associated with any other plant, Ware said.

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Revision of Trees Book
Now Available At OSU

A 127-page illustrated revision of the booklet "Ohio Trees" is now available. It is authored by F. W. Dean, L. C. Chadwick and William Cowen. The new revision covers more than 150 tree species, giving a species key and descriptions of genus and species. For information write to Dr. K. W. Reisch, 1827 Neil Ave., Columbus, Ohio 43210.

Greater Drift of Spray With Small Droplets

Large spray droplets and calm weather are musts if contamination by spray drift is to be reduced.

Large drops naturally fall faster and more directly to the ground. Small droplets fall slowly and breezes carry them laterally. This causes the common damage problems.

Orrin Berge, agricultural engineer, University of Wisconsin, has pinpointed drift factors. He says that droplets the size of light rain will fall 10 feet in 2 seconds. These can be carried sideways only about 8 feet in a 3 mph wind. But particles the size of mist take a full 10 seconds to drop 10 feet in a 3 mph wind. These smaller droplets can drift 44 feet laterally in the 10 seconds they are airborne. Even smaller droplets, those the size of water vapor or fog need 17 minutes to drop 10 feet. This lets them drift almost a mile in a 3 mph wind.

Larger droplets are possible by use of a 10-gallon per acre nozzle size, rather than the 5-gallon size. Reducing the spray pressure will also increase the particle size. A pressure of 30 pounds per square inch is adequate for almost all weed and insect control work.

Berge cited other drift reduction procedures. He suggested lowering booms on sprayers to 2 feet above the ground and use of non-vaporizing sprays when possible. The ester forms of insecticides and herbicides are the most volatile. They are most likely to drift farther than the amine forms of chemicals. Whenever a choice is possible, the amine form should be used.

Spraymen Assume Liability When Mixing Own Chemicals

Liability is assumed by the sprayman of a herbicide mixture if the mixture is not registered and labeled by a company. Conversely, if a manufacturer secures a government registration for a mixture he then becomes liable.

A sprayman may legally mix and apply a herbicide mixture containing chemicals which are registered individually, but he must then accept liability. Without a label, the sprayman will find difficulty in obtaining information on the rate of each herbicide and when to apply the mixture.

According to Dr. Richard Behrens, plant scientist, University of Minnesota, the advantages to be gained from mixtures are several. These include control of a larger variety of weeds, consistent weed control under various weather conditions, less chance of herbicide residue in soils, lower herbicide costs, and increased herbicide effectiveness.

New Fruitless Olive Tree Imported From Australia

Horticulturists at the University of California, Davis, have adapted an ornamental "fruitless" olive tree. Grafting wood of the tree will be given to nurseries this summer for propagating purposes.

Foliage of the tree is the same as commercial varieties grown in California. The underside of the leaves has the desirable gray coloration but the young stems are a little angular in shape instead of round.

Cuttings of the tree are difficult to root so propagation will be done by budding or grafting onto rootstock plants. Distribution of the grafting wood will be done by the Foundation Plant Materials Service Dept. of Viticulture and Enology, University of California.

The tree is to be named "Swan Hill" after the town in Australia where the original was found. Scion wood from this site was brought to this country in 1960 by Hudson T. Hartmann, professor of pomology, UC.

Herbicide Buildup Not Serious In Nurseries

A recent survey shows no serious buildup of herbicide residues in nurseries. Large herbicide buildups which might be expected from repeated applications did not materialize.

Leroy Holm, University of Wisconsin scientists, reports the continued use of simazine in a Connecticut nursery showed no harmful effects on yews and Euonymous shrubs. These shrubs had been used as indicator plants for 5 years. The use of a single chemical such as simazine, however, did invite the buildup of perennial weeds such as bindweed and vetch.

Established plants of Euonymous can have chemicals like simazine, diuron and neburon applied around them without hurting the plants. If they are removed and new plants placed in the herbicide-treated soil, the new plants may develop injury.

Sensitive plants such as Douglas fir, Arborvitae and Con- toneaster were not harmed when planted in a nursery in Wisconsin. In this case, the soil had been
treated annually for 5 years with applications of diuron, simazine and neburon.

In New York there was no important carry-over although herbicides had been applied 10 to 13 seasons.

According to Holm, other reports from the South and the West coast also gave the same evidence of no serious accumulation of residues.

New Booklet Available On Hydro-Mulching

"Hydro-Grassing and Mulching," a new booklet geared to the industry, explains high speed grassing methods. Techniques employed on highway, levee, and airport sites are covered. These continue to be of increasing importance for residential, commercial and factory projects. For a free copy, write to: Reinco, Inc., P.O. Box 584, Plainfield, New Jersey 07061.

Understand The Label
Know Chemical Contents

Read the label, especially the fine print, when purchasing a pesticide.

Dr. Erick B. Nilson, pesticide safety specialist, Kansas State University, Manhattan, K a n ., cautions that the one safe way to buy pesticides is by the active ingredient content. Thus, the label needs to be checked carefully. Nilson says trade names do not always identify the contents. Ingredients may be added or percentages of active elements increased without a trade name change. Containers of the same shape and color may hold chemicals with different active ingredients. A wide variety of pesticides may be packaged under the same trade name.

Nilson advises buying pesticides by the specific chemical needed.

Clean up roadsides, ditches, or any noncrop land with MBC. MBC is a nonselective herbicide—spread or spray it on and it kills top growth almost on contact, leaches into the soil to attack roots, sterilizes soil for at least a season.

MBC completely eliminates Johnson grass, bur ragweed, hoary cress, and other troublemakers.

Also for low-cost control along roadsides or on smaller areas such as fence lines and around power-line towers, try Hooker Sodium Chlorate. It gives you control over all weeds and protects against their return for up to two years.

For more information on these powerful killers, write Agricultural Chemicals, Hooker Chemical Corporation, 404 Buffalo Avenue, Niagara Falls, N. Y. 14302.
Modern Irrigation System on 850 Acres Aids Quality sod Production At Emerald Valley

EMERALD VALLEY Turf Nurseries, Gregory, Mich., features production of cultured sod, now the fastest growing farm product in Michigan.

Besides management and marketing methods which rank with the best in the nation, this sod farm is blessed with muck, or peat, soil with an ideal surface drainage of one foot of fall per 1000 feet.

A system of drainage ditches with dam control units are used for sub-irrigation during dry weather periods. In addition, Robert Daymon, president of Emerald Valley, has developed one of the most modern and efficient irrigation systems to be found on sod farms.

Four miles of 10-inch underground pipe carry water from 3 giant, electrically driven deep well pumps. Water is pumped over 40 miles of quick-coupling surface pipe which can pour on irrigation water at the rate of 2½ million gallons per day.

By use of this irrigation system, fertilization, and other management plus factors, Daymon, on his peat soil, can insure quick seeding starts, hasten maturity on a quality crop, lift and market the sod, and reestablish a crop each year.

Daymon's father, Leonard A. Daymon entered the nursery business in 1919. The senior Daymon is now retired but two sons carry on the family tradition. Leonard, Jr., owns and operates a sod farm in suburban Detroit.

Sons, Robert and Glenn, purchased 514 acres of muck land near Gregory in 1959. Glenn is now deceased and Robert C. is sole owner. Of the 514 acres only 250 was tillable when purchased. Today Emerald Valley consists of 1350 acres, 850 of which is in sod.

Day-to-day operations of Emerald Valley are supervised by Farm Manager Richard Gorrell, from a modern air conditioned office and service building. Gorrell is always in instant communications with each foreman and all major equipment by a modern 2-way radio system.

A 4-place company plane
HADFIELD AUTOMATIC SOD ROLLER
ROLLER + SOD PLOWS Patent Pending
1. Cuts, rolls and pulls sod sideways.
2. Easily attached to sod cutter.
3. Send for pictures and literature.
4. 4 models to choose from.
5. As low as $795.00 F.O.B. Oxford.
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The Turf Rack gives you these needed advantages:
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• Skilled operators unnecessary

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926-2443
stands by to insure fast transportation to and from the market centers of the midwest.

However, in deference to the time, capital and technique that has been applied at Emerald Valley Turf Nurseries, the soil itself is a major factor in this success story. Muck or peat soil is very important in quality sod production in this area.

Though the sod business started in Michigan some 45 years ago, the "muck or peat soil" at Emerald Valley had its beginning many thousands of years ago. The muck ranges in depth from 8 to 35 feet. This highly organic black soil, known as muck, is the results of thousands of years of vegetation decay. It is so organic in nature that it is constantly changing, in fact, so organic it can almost be referred to as a living thing. Once only a swamp land of stagnant water, mammoth trees and rotting foliage, it was untouched and undeveloped for many lifetimes.

The first step necessary in the development of Emerald Valley was to drain the swampland by means of canals. Once the land was dry, trees, underbrush and roots were removed and the land leveled.

A successful sod farm must, by the nature of the product, be perfectly level. Each year after harvest, Emerald Valley land is cultivated and many tons of tree roots are worked up from deep in the soil and carted away. Levelers are then used ahead of reseeding.

An interesting side benefit or plus in working with peat soil when cultivating sod is that a square yard of sod can be produced which is lighter in weight than that grown on mineral soils. In addition, such sod is easier to cut, handle and transport. It also has the additional benefit of a healthier and faster growth when transplanted, according to Daymon.

Emerald Valley Turf Nurseries cultures only a special strain of Merion Bluegrass. Once a field of sod is removed, the land is prepared, fertilized and seeded for the coming year. The staggering of seeding throughout the year insures a constant maturity of each individual plat as needed to supply demand.

Each field is mowed three times weekly during the growing season. Special engineered wide metal wheels are designed to be used on all equipment which travel on the sod fields. (See WTT, February, 1968, Page 36.) These specially designed metal wheels also roll and level the field as the grass is mowed. The absence of tracks or ruts insures an even cut with the sod is harvested.

Daily harvesting of cultured sod begins with cutting and rolling of sod in either 1 or 1½ square yard rolls. A specially designed Sod Roller (See WTT, February, 1968, Page 37) has been developed at Emerald Valley during the past 5 years. It rolls up to 2000 yards per hour.

The Daymon Sod Roller not only rolls sod at Emerald Valley but is manufactured by Daymon Manufacturing Corporation and marketed throughout the United States and Canada.

Another unique development at Emerald Valley is a re-engineered truck tractor with 18-wheel drive. This unit pulls a 1500-yard load from the muck land regardless of weather or soil condition. A specially designed side loading conveyor which rolls freely along the trial.
er bed expedites loading of each 1500-yard load.

Once out of the field, the 1500-yard loads are transferred to a fleet of company owned highway trucks for immediate transportation to landscapers, nurseries and garden centers throughout Michigan, Ohio and Pennsylvania.

It is not unusual for 10,000 to 15,000 yards of "Emerald of Michigan" sod to go into any one market on a given day.

The current development of Emerald Valley and its bluegrass sod along with the Daymon Sod Roller, side conveyor loader, special 36-inch wide tractor wheels, and special truck tractor attest to the imagination and ingenuity of Daymon and his staff.

Emerald Valley has also worked very closely with county agricultural agents throughout southeastern Michigan and with the Soil and Science Department at Michigan State University.

One high point at Emerald Valley was July 12, 1967, when Daymon and his staff hosted more than 100 university department heads, county agricultural agents and commercial sod producers from throughout the United States and Canada. Occasion was a Michigan State University-sponsored 2-day event at nearby Lansing, the better part of one day being spent at Emerald Valley.

New Brushkiller Available For Spraymen

Diamond Shamrock Chemical Co., has developed a new brush control preparation, Diamond Special Brush and Weed Killer No. 345. A wettable powder, it contains non-volatile 2,4-D, DSMA (Disodium Methanesulphonate) and a surfactant or wetting agent.

Diamond says it will control and suppress growth of many weeds, grasses and brush normally controlled by either 2,4-D or DSMA plus surfactant. These include blackjack oak, bracken fern, brambles, chestnut oak, chokecherry, hazel, pine, pin oak, poplar, red oak, sumac, white oak, willow, and yellow birch.

For application, the powder is mixed with water (25 pounds per 100 gallons) and agitated continuously during preparation and application. The prepared liquid is applied as a drenching spray at a rate of 100 to 300 gallons per acre, depending on brush density.

The company suggests use of the new material on railroad and utility rights of way, roadsides, riverbanks, farm fence rows, and similar non-crop areas. Availability of the new product should help with the shortage of brush control agents brought about by government purchase of almost all 2,4,5-T produced in the U.S.A.
American Sod Producers Discuss Industry
At First Annual Meeting, San Francisco

Sod growers, meeting at San Francisco and for the first time as a national group, decided that grass is about the same color on both sides of the fence. In short, producers in every section of the country have their problems. These include narrowing profits coupled with rising costs, labor shortages, marketing, handling, and a host of lesser concerns.

Members of the American Sod Producers Association met in a separate session, but in conjunction with the annual turf conference and show of the Golf Course Superintendents of America. More than 70 attended the west coast session, several of whom were industry representatives. Ben O. Warren, Warren's Turf Nursery, Palos Park, Ill., expressed pleasure at the grower representation from all sections of the country, especially for their interest in this initial session.

A grower from each sod producing section of the country outlined industry problems for his own area. Not too surprisingly, these proved to be largely common to the entire country.

Nunes sod harvester was demonstrated to ASPA group who attended San Francisco meeting. Harvester can be adapted to handle both rolled and slabbed sod in various sizes. Unit is sold by Nunes complete with special built Ford tractor.
Richard Horner, Horner Sod Farms, Wind Lake, Wis., observed that among the unique problems of sod are extreme weight and perishability. Selling price on a weight basis may amount to only 1¢ per pound. Further, he said, the goal is to get this product delivered up to 100 miles within 5 hours after receiving a call. In the midwest area, where he operates, near Chicago, Horner pointed out that the short season forces him to do 1% of the season's business in a single day. These are some of the rather unique management problems which face sod producers.

But problems do not end with the physical handling of the product. Horner found strong agreement among the group when he stated that there is an inability to get strong identification of the product, especially when sod is delivered in a truck other than that of the individual grower. Different levels of pricing also present a problem. Sod is sold in the field at a price too low to assure the grower a reasonable return, especially, in the face of rising costs.

Ousley Represents Southern Sod Producers

Representing southern growers, James E. Ousley, Sr., Ousley Sod Company, Pompano Beach, Fla., said that increased costs of land were forcing growers farther from the sale area. Production costs are up, he said, and competent personnel to operate an extensive sod business are not available. Labor is also in short supply, Ousley said, and skilled help to handle machinery is almost impossible to obtain.

Ousley pointed out that in his area where sod is grown on sand based soil, sod can not be mechanically rolled because it will not hold together. This makes hand loading of pallets almost mandatory. Thus the labor problem is critical, especially when weekend help is needed. Draining is another problem, he said, which is delaying a move to automation in harvesting of sod.

Ousley said that chinch bugs were becoming a greater problem; billbugs are also increasing. These latter entail expensive treatments for control.

Sod growers, according to Ousley, who own land rather than leasing land, and who are diversifying their operations seem to be making the most progress at the moment. He said that more bermudagrass is being grown as more golf course superintendents are using this when replacing sod. St. Augustine remains the big seller in the area.

Among marketing problems, Ousley mentioned that a lack of communications has existed among growers. Because of this, middlemen have been able to play one grower against another. This has led to pricing practices

Edwin Mutoza, Nunes sales manager, visits with, left to right: Dr. Elwyn E. Deal, University of Maryland; Doyle Jacklin, Jacklin Seed Co., Dishman, Wash.; and J. L. Kidwell, Kidwell Turf Farms, Culpeper, Va.
which have forced some growers out of business. As a result, growers in Florida have recently decided to meet and discuss mutual problems and seek solutions as a group. Ousley said that there is a great need to educate the public on quality sod. An aid to sales is proving to be chain store distribution since such stores are adding sod as a line in many cases.

Speaking for the west coast sod industry was Tobias Grether, Cal-Turf, Inc., Camarillo, Calif. Grether said credit problems in dealing with landscapers was one of the major headaches. Another major problem in the California area, he said, is the need to provide a firm supply of 9 varieties, as Cal-Turf does, and to deliver sod at altitudes ranging from sea level to 6000 feet. This creates problems in handling the product for delivery.

Hurtling the sod market on the west coast, Grether said, is the fact that the public has no real consciousness of sod. Concept of the product is generally unknown, and seems unique to the area. Less than 1% of Cal-Turf sales, according to Grether, come in over the transom. As a result, salesmen are needed to move the product, and the product must be kept high in quality.

Oversupply of Sod On Eastern Market

Wiley Miner, president of Princeton Turf Farms, Inc., Cranbury, N. J., said growers on the east coast are troubled with an oversupply of sod. People maintain land in sod which is being held for speculation. Miner pointed out that large, expansive fields for sod production are difficult to obtain in the New Jersey area because of the pressure for land. Miner said Princeton's largest field was 140 acres and that their sod is cultivated on 16 farms which stretch over a 22 mile area. In Maryland, however, he said, the corporation does have large fields.

Miner feels that the sod industry needs guidelines and standards. He believes growers would gain by being able to provide the landscape architect a set of uniform specifications. This, Miner told growers, might help build and hold the market. He called on the group to "dig in" and to make ASPA a working organization.

Growers met only on Feb. 21 in a formal session. Most of those present, however, accepted the invitation of John Nunes to visit the Nunes sod farm at Patterson, Calif., on the following day. This turned out to be a highlight of the first annual session. Nunes demonstrated harvesting and other equipment used in his operation.

Officers and directors who were elected at the July 11, 1967, East Lansing, Mich., organization meeting were reelected to serve an additional term. President is Ben O. Warren, Palos Park, Ill. Vice-president is Robert Daymon, president of Emerald Valley Turf Nurseries, Howell, Mich. Elected treasurer was Louis DeLea, Louis DeLea & Sons, East Northport, Long Island, N. Y.; and secretary, Richard Horner, Horner Sod Farms, Wind Lake, Wis. Other members elected to the 7-man board besides the officers were: Tobias Grether, Cal-Turf, Inc., Camarillo, Calif.; J. E. Ousley, Sr., Ousley Sod Company, Pompano Beach, Fla.; and Wiley Miner, Princeton Turf Farms, Inc., Cranbury, N. J.; George B. Hammond, Paint Valley Bluegrass Farm, 71 E. State St., Columbus, O., continues as executive-secretary. The group voted to again hold their annual meeting in conjunction with the GCSAA.
Interior live oak (Quercus wislizenii) occurs on mountain slopes below 5000 feet and valleys from Siskiyou County, Calif., southward through the Coast Ranges, the Sacramento Valley, and the Sierra foothills to northern Baja. The tree forms are often in woodlands containing other species of oak and digger pine (Pinus sabiniana). The scrub varieties are generally present in chaparral. The genus Quercus, a member of the Beech Family or Fagaceae, is divided into two large groups, white oaks and black oaks. Interior live oak belongs to the latter. In all, there are about 450 species of oaks which are widely distributed in the northern hemisphere and into the mountains of the tropics.

Interior live oak is an evergreen tree from 30 to 70 feet tall, with rounded top and smooth bark which becomes furrowed with age. The leaves are mostly oblong, varying from elliptic to lanceolate in shape, with blades from 3/4 to 2 inches long and petioles about 1/4 inch long. They are firm, with either smooth or spiny edges, and glabrous and shining both above and beneath. The flowers are small, without petals, green or yellowish, and unisexual, with the staminate and pistillate on the same plant. The acorns are oblong, ovate, sharp pointed, from 3/4 inch to 1 1/4 inches long, 1/4 to 1 1/2 inch thick, and with scaly cups. Like all black oaks, they mature during the second autumn.

Interior live oak control is wanted most on rangelands; here, where perennial grasses and clovers are planted, oak brush is detrimental. Then again, we do not want live oak trees or brush growing beneath power lines, on rights-of-way, or close to houses where it creates a fire hazard. Where water is not adequate, more water can be made available by clearing or partially clearing watersheds. Since live oaks constitute important members of the watershed, their removal can be highly beneficial, as water not used by the trees becomes available to the people who live in the area.

There are several methods of killing interior live oak trees or brush. One practical method for killing trees is to make cuts closely spaced around the bases of the trunks and to apply an amine form of 2,4-D to the cuts. Winter is the best time to make such applications. Smaller stemmed trees and brush can be sprayed basally using brush killer mixtures of 2,4-D and 2,4,5-T alone, in oil. The basal parts of the stems must be thoroughly soaked to obtain results. The most effective time to make these treatments is early spring.

It is most desirable to burn areas prior to killing the live oak. The sprouts can then be killed by repeated applications of brush killer or silvex; the latter is often more effective. Current evidence suggests that picloram added to other phenoxyxs often gives a better kill than other methods. Aircraft applications have been effective in giving top kills, but results in poor root kills. Another approach has been to place 2 ounces of 25% fenuron pellets at the base of each group of sprouts in the winter; under this method, killing will take place slowly and may continue for 2 to 4 years.

Picture from: Murman Slide Collection, Library, Univ. of California at Los Angeles
Prepared by: O. A. Leonard, Botanist, assisted by B. J. McCaskill, Senior Herbarium Botanist, Botany Department, University of California, Davis, California
New Products...

Designed for the Turf Irrigation Industry

Metered amounts of fertilizers, herbicides, pesticides, or fumigants can be applied simultaneously by means of adjustable output, Model 67-JP "proportioning pump." Offered by Inject-O-Meter Manufacturing Co., Box 1044, Clovis, New Mexico, pump can operate by means of a V-belt from the drive shaft of an irrigation engine (see photo), or with its own separate electric motor. Widely used for controlling liquid feeds of treatment chemicals in industrial plant operations, the proportioning pump provides a dependable method of accurately regulating the proportion of liquid additive to irrigation water. Simplex Proportioning Pump with V-Belt drive, left, and schematic diagram showing how proportioning pump (duplex) meters fertilizer and pesticide into irrigation water line, below.

Toro's new "Vari-Time" Control System has a central control (top) which signals satellite controls electrically. The satellites (each controls 11 stations) then send hydraulic (or electric) signals to open and close all valves. Only three central controllers are required to signal an entire golf course sprinkler system for automatic or semi-automatic operation, or by-pass, as the weather dictates. Toro Manufacturing Corp., 8111 Lyndale So., Minneapolis, Minn. (See pictures below).

Non-electric timer controlled irrigation valve, incorporating numerous new engineering features, has been introduced by Test Corporation, P. O. Box 566, Ashland, Ohio. Valve is completely automatic and operated by water pressure in main line. Time control will rewind itself and can be programmed to open the valve automatically any time during the day or night. Watering duration is adjustable from 10 minutes to 1 hour as often as required. New valve has application in automatic irrigation where no electric supply is available.

Executive 11 & 5-station automatic sprinkler controller has a 14-day calendar wheel for automatic round-the-clock operation. Variable timer permits programming of water zones to specifications. Write: Turf Irrigation Corp., 517 Atlantic, Freeport, N. Y. 11520.
Classifieds

When answering ads where box number only is given, please address as follows: Box number, c/o Weeds Trees and Turf, 9800 Detroit Ave., Cleveland, Ohio 44102.

Rates: "Position Wanted" 10c per word, minimum $3.00. All other classifications 20c per word, minimum $4.00. All classified ads must be received by Publisher the 10th of the month preceding publication date and be accompanied by cash or money order covering full payment. Bold-face rule box: $25.00 per column inch, two inch minimum.

FOR SALE

PRIME TREE SPRAYING business located in Westchester County, New York, established 20 years ago. Gross volume approximately $55,000 to $65,000 a year plus considerable tree surgery work that is referred to other companies in the area. There is more than $40,000 in equipment which ranges from office data processing machines to 600-gal. hydraulic sprayers. This also includes a modern 2-way radio network with three licensed base stations. There is approximately a $5,000 inventory. This gross business is done in less than a seven-month period with a payroll of only $12,500. It nets well into five figures plus other valuable considerations for its owner. The asking price is $50,000, or we would consider selling the business and equipment separately. Terms arranged. Priced for a quick sale. List of equipment and inventory mailed on request. Mail inquiry to Mr. H. G. Widmark, Pres., Widmark Scientific Control, Inc., Drawer 151, Harrison, N. Y. 10528.

FOR SALE

IOWA BOOM unloader, standard model, less bed, new expanded upright, newly rebuilt, cleaned and prime painted, $2300. Minn Turf Equipment Corp., 7100 France Avenue, South, Edina, Minn. 55435.

NATIONAL 72-inch riding reel mower, Mott 24 inch self-propelled hammer knife mower. All in excellent condition. Lake View Memorial Gardens, Belleville, Illinois 62221.

SPRAYERS, USED, all sizes and makes, at large savings. Send your requirements. Equipment Sales Co., 4742 Sunrise Highway, Massapequa Park, N. Y. 11762.


REBUILT RYAN Sod Cutters with or without cutoff. Sharon Welding Company, 11674 U.S. 42, Cincinnati, Ohio 45241.

HELP WANTED

FIELD SUPERVISOR Industrial Weed Control firm in eastern Pennsylvania is looking for a field supervisor. Degree in one of the agricultural sciences is desirable but not necessary. Write Box 30, Weeds, Trees and Turf, 9800 Detroit Ave., Cleveland, Ohio 44102.

POSITIONS WANTED

AGGRESSIVE, profit-minded experienced and production and marketing manager with proven record, seeking right opportunity with expanding sod operation interested in dynamic growth. Write Box 31, Weeds, Trees and Turf, 9800 Detroit Ave., Cleveland, Ohio 44102.

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WEEDS TREES AND TURF, April, 1968 41
Only By Chance Do Bark Beetles Locate Elms

Scientists have found insect-feeding stimulants and deterrents in the bark of some trees. Most important is the chemical in the American elm which stimulates bark feeding by the European elm bark beetle, transmitter of Dutch elm disease fungus.

The scientists also discovered that the beetles are not actually attracted to healthy American elms as was previously believed. Instead, beetles feed on the elms only when finding them at random in their flight. If the beetles land on non-host trees, they are deterred from eating by a chemical in the bark. They continue on until they find an American elm.

Both discoveries, according to the researchers, will have great significance in control of Dutch elm disease. They also provide information about the probable nature of chemical communications between many other insects and their perennial host plants.

University of Wisconsin scientists, Dale M. Norris, James E. B. Baker, B. M. Trost and Barry L. Gilbert, have isolated the chemical stimulant, pentacyclic triterpenes, from the bark of American elms. A deterrent chemical, juglone, has also been isolated. Juglone keeps the elm bark beetle feeding by the European elm bark beetle, transmitter of Dutch elm disease fungus.

Bark Beetles Locate Elms

Forest of Fifty. Each state is represented by its official or otherwise favorite native tree in a unique planting near Portland, Ore. The Oregon Association of Nurseries has established a 50-tree forest of state trees just south of Portland at a rest area on the Baldock Freeway. The site is near the Hubbard Interchange. Trees are small as yet, since the young forest was established just more than a year ago. The first group of 13 trees represents the original 13 colonies. Then come state trees by sections of the country. This is a tribute to the national beautification program and to each state, thanks to Oregon’s progressive nurserymen.

Green Seed Marks the Trail. Embankments on the interstate highway through Salt Lake City, Utah, have been planted with dyed grass seed sprayed on with a hydrosedger. Green dyed seed serves as a marker for workmen who can easily spot the areas covered.

Trial By Students. Colorado State University is establishing a research green for student use. A 10,000 square foot area near the Student Union will be used in the hope that heavy student traffic will simulate golf course conditions. Idea is to research methods for establishing superior greens. Agricultural Extension Director R. E. Nelson is also seeking US Golf Association support for funds to research soil matrix needs for turf maintenance under heavy recreational use.

We goofed. Our apologies to Hercules, Inc. and Evan Swartz. We ran an interesting article in the March WTT on the use of invert sprays for improved spray drift control. Author Swartz, director of the Weed Department at Shawnee, Kan., related his experiences with Visko-Rhap used for roadside spraying. We ran the article with a headline which said “thickeners” when we should have said “Use Invert Sprays.”

Good News for the Industry. The University of Delaware Research Foundation has just released a report stating that herbicides used in farm and industry are not contaminating ground water. E. M. Rahn, horticulturist at UD, reports that herbicide residues appear in small amounts in surface runoff water only under unusual conditions. Highly sensitive detection methods to analyze ground and surface water were used on periodic samples from fields treated with atrazine and trifluralin, and from an industrious area treated with enough bromacil to control vegetation for a period of years. No trace of herbicides was found in ground water seeping into nearby drainage ditches or streams. Surface runoff showed only 10 parts per billion, which is about 100 times less than the amount considered harmful to plant or animal life.
Insect Report

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

ORNAMENTALS

APHIDS
(Aphis spp.)

Alabama: A. spiraecola eggs hatching on spirea plants in central and southern areas throughout winter; adults not abundant. Nymphs increased to 10-25 per branch tip in Lee county due to higher temperatures and more sunlight hours. Arizona: A. spiraecola heavy on young tip growth of many pyracantha plantings in Phoenix area, Maricopa County. A. nerii heavy on oleander terminals in Yuma, Yuma County.

PEA APHID
(Acyrthosiphon pisum)

Arizona: Heavy on untreated snapdragon plantings in west Phoenix area, Maricopa County.

TULIP BULB APHID
(Dysaphis tulipae)

Alabama: Heavy in several packages of iris bulbs shipped from an out-of-state nursery; moisture loss to bulbs and thousands of dead and dying aphids resulted.

TREE INSECTS

WHITE-PINE APHID
(Cinara strobi)

Maryland: Eggs heavy on white pine needles at Bel Air, Harford County.

BARK BEETLES
(Dendroctonus frontalis)

Maryland: Killed isolated loblolly pines in Worcester and Somerset Counties.

(IPS spp.)

New Mexico: Killing ponderosa pines at Los Alamos, Los Alamos County.

DOGWOOD BORER
(Thamnosphecia scitula)

Alabama: Larvae active on warm days on dogwoods on lawns and streets in southern and central areas; some pupation evident.

EASTERN TENT CATERPILLAR
(Malacosoma americanum)

Alabama: Egg clusters light, 0-3 per tree, on isolated cherry trees in Lee County; no hatch to date. Some egg masses partially destroyed, probably by birds.

AN ARMORED SCALE
(Hemiberlesia lataniae)

California: Moderate on palm nursery stock in Fallbrook, San Diego County.

PINE NEEDLE SCALE
(Phenacaspia pinifoliae)

Alabama: Very light on few loblolly and slash pine plantings in Lee County; lighter in area than in most years.

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, 9800 Detroit Ave., Cleveland, Ohio 44102.

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New Brunswick
New Jersey 08903
New Ryan "Sulky Roller" attaches to Ryan Sod Cutter . . . rolls over 10,000 yards per day.

This is NEW from Ryan. The new Ryan Sulky Roller makes your Ryan Sod Cutter the most versatile, labor-saving machine you can own. The Sulky Roller attachment allows one operator to ride, cut, mark to any length, roll and turn rolls from the cutting path . . . ALL IN ONE EASY OPERATION.

The Ryan Sulky Roller attaches quickly and easily to your Ryan heavy duty Sod Cutter with six bolts into six existing holes. It operates efficiently in all soil conditions. The single operator can harvest over ten thousand yards of sod per day.

The price of the new Ryan Sulky Roller attachment is less than $800. It is fully guaranteed and covered under the warranty of your Ryan Sod Cutter.

Boost your sod production

**AUTOMATIC SOD ROLLER**
produced by Ryan rolls sod forward and lays it to either side for easy pick-up.

**RYAN SOD HARVESTER**
enables two men to cut, roll and palletize thousands of yards of sod per day.