WEEDS TREES and TURF

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November 1966

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See Pg. 6

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WEEDS TREES and TURF

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Spraymen East and Spraymen West

Apparent collapse of the National Association of Spraymen before it ever emerged from the planning stage seems to have led to renewed emphasis on area associations for spraymen. This may well be a desirable development that will allow spraymen to calibrate their thinking and goals before tackling the big job of organizing nationally.

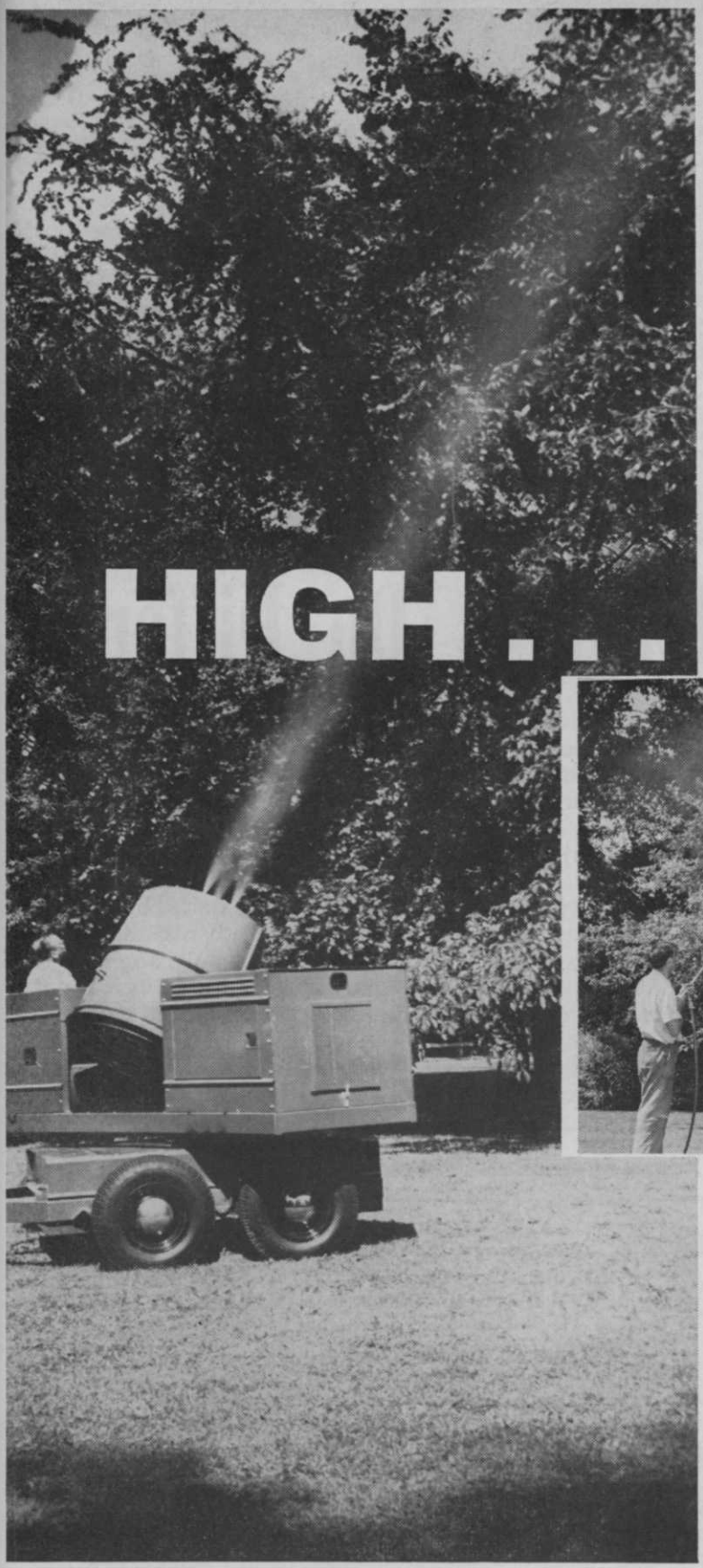
A proposal to form a Horticultural Pest Control Association for the Eastern U.S. is now being deliberated by Florida spraymen. It's our hope that a true area association will evolve from these deliberations and that, eventually, East and West will get together, work out their differences, and nationalize their programs. Now as never before, spraymen need a coherent voice in legislative and other matters affecting all in the profession.

What can a spraymen's association accomplish? Last month, *WTT* reported on the newly organized Pacific Northwest Spraymen's Assn., which includes Oregon and Washington. Conferences, short courses, public relations and education, insurance and legislation committees: these are among self-professed aims of Northwest spraymen. Is this just a nice sounding platform to placate the dues-paying membership? No, PNSA has shown it means business.

President Bill Owen writes that their '66 Spray-O-Rama was an outstanding success, both from attendance and from program participation. Through the organization's actions, accident and health insurance programs are now available to members on a *group* basis. The association has been active at meetings called to consider changes in Oregon pesticide applicator laws, and plans to be there when similar meetings occur in Washington. Further, PNSA is investigating establishment of a permanent chair at a state agricultural university for research and extension work in ornamentals.

In short, Northwest spraymen are neither standing pat nor waiting around to see what happens. This is the sort of action required to snap spraymen out of the doldrums and move a spray association into public recognition. Culminating years of organizational effort, a PNSA letter outlining its program drew an excellent response, along with a number of requests for information and meeting dates. Perhaps, and *WTT* hopes this will happen, once spraymen grow accustomed to acting on an area level, they will be ready, with the advantages of far more experience and background, to consider a larger group geared for action on a national level.

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



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Nutgrass in Tifton 328 bermudagrass can safely be controlled with DSMA or AMA. Not so when nutgrass appears in red fescues and bents, which are easily injured by these chemicals. Below, author Callahan discusses safe use of many common herbicides.

By

LLOYD M. CALLAHAN

Assistant Professor of Agronomy
University of Tennessee, Knoxville

Select herbicides carefully . . .

Turfgrass Tolerances Do Differ

HOW IMPORTANT are herbicides in turf management? If used correctly, herbicides can play a very important role in a turf management program. However, an attempt should not be made to rely solely on herbicides as a substitute for any of the other practices important in managing turf. Greater emphasis should be placed on adequate and timely fertilization, correct watering, and frequent mowing at the proper cutting height.

Herbicide Function Should be Temporary

Many people believe that herbicides have to be applied year after year in order to keep a weed-free turf. This is entirely wrong. In fact, the repeated use of any herbicide can easily weaken the turfgrass, rendering it highly susceptible to disease attack. The use of herbicides should play only a small part in any turf management program. Their function should be temporary and only to give the turfgrass the advantage in competition with weeds, while at the same time eliminating the weeds or the bulk of the weed seeds in or at the soil surface.

Weeds most common in turfs can generally be separated into two groups: "broadleaf weeds" and "grassy weeds." Herbicides commonly used in the control of broadleaf weeds are shown in Table 1. The effects of these herbicides on some of our prominent turfgrasses are given in Table 2.

The herbicide injury ratings shown for the turfgrasses in these following tables are based on evaluations from turfgrass weed control research conducted throughout the country. It should be remembered that these are simply general ratings since the response of a turfgrass to an herbicide can fluctuate with changing climatic and soil influences.

Most turgrasses, except bentgrasses, are generally tolerant to the commonly recommended rates of 2,4-D and silvex for the control of broadleaf weeds. The lower rate of these chemicals can be used on bents during cool periods with only slight injury. However, the heavier rates should not be used at any time of the year.

Dicamba will control chickweeds effectively but can easily

Table 1. Postemergence herbicidal control of broadleaf weeds.

Weed	Herbicide	Rate lb. ai/A*	Time and Number of Applications
Dandelion Broadleaf Plantains Buckhorn Plantain	2,4-D (amines & esters) silvex (esters)	1-1½ ½-1	Late summer and fall (2-3 applications at 10-14 day intervals) and early spring (1-2 applications at 10-14 day intervals)
Mouseear and common chickweeds Henbit (Winter Mint)	silvex (esters) Dicamba (amines)	¾-1 ½-1	Fall to early winter (2-3 applications at 10-14 day intervals) and late winter to early spring (1-2 applications at 10-14 day intervals)
Wild Garlic Nutgrass	2,4-D (amines) + DSMA or AMA	1 2-4	October to December; February to early April. Treatments at 10-14 day intervals. Important to treat small shoots in November.

* lb. ai/A = pounds active ingredient per acre.

cause injury to Kentucky bluegrasses, red fescues, and bentgrasses.

Extreme care should be exercised in using 2,4-D, silvex, and dicamba around trees, shrubs, and flowers to avoid serious injury to these plants from spray drift.

The methylated arsenicals (DSMA and AMA) are generally safe on bermudagrasses and zoysiagrasses at low rates but should not be used on St. Augustine, centipede, carpet, or bahiagrass. Injury to bluegrasses can be prevented if low rates are used during the cooler periods of the year. Red fescues and bents can be easily injured. All of these grasses can be moderately to severely injured with higher rates. Tifgreen bermudagrass is particularly susceptible to these arsenicals. When DSMA or AMA is mixed with 2,4-D, the low rates of both should be used since retreatments are often needed.

Turf Tolerances To Grassy Weed Killers

Many herbicides now on the market will give excellent control of crabgrass, goosegrass, and annual bluegrass (*Poa annua*). A list of several preemergence herbicides, their rates, and general level of persistence is shown in Table 3. The general tolerance of turfgrasses to these herbicides is shown in Table 4.

For the most part, these herbicides need to be applied and well "watered in" before annual weedy grasses germinate, or their effectiveness can be greatly diminished. Injury to turfgrasses usually occurs as contact foliage burn or physiological injury following absorption through the roots.

Dacthal is a relatively short-lived herbicide generally safe to most turfgrasses but has caused injury to red fescues and creep-

(Continued on page 17)

Healthy buckhorn plantain (above) fades rapidly when treated with 2,4-D. Knowing which herbicide to use and proper dosages can make the difference between dead weeds (below) and dead turf.

Table 2: General tolerance of turfgrasses to a few commonly used post-emergence herbicides.

Chemical	Rates lb. ai/A	Turfgrass Injury Ratings[1]				
		Bermuda	Emerald Zoysia	Kentucky Blue	Red Fescue	Bent Greens
2,4-D	¾-1½	1	1	1	1	1-3
Silvex (2,4,5-TP)	½-1	1	1	1-2	1-2	2-4
Dicamba (Banvel D)	½-1	1	1	1-2	1-3	2-4
DSMA	2-6	1-2	1-2	1-3	2-4	2-4
AMA	2-4	1-2	1-2	1-3	2-4	2-4

[1]Injury Ratings: 1 = no injury; 5= complete kill.

Table 3. Average rates and general persistence of several preemergence herbicides used for the control of crabgrass (*Digitaria sanguinalis* and *D. ischaemum*) in turfgrasses.

Chemical	Av. lb. ai/1,000 sq. ft.	Av. lb. ai/ acre	Seasonal Persistence	Rate to Apply Next Season
Dacthal	0.25	11	None	Full Rate
Trifluralin	0.03	1½	None	Full
Benefin	0.04	2	None	Full
Tupersan	0.46	20	None	Full
Betasan	0.34	15	None	Full
Calcium Propyl Arsenate	1.0	45	None	Full
Azak	0.23	10	None	Full
Zytron	0.34	15	50%	Half Rate
Bandane	1.0	45	50%	Half
Chlordane	2.0	85	50%	Half
Calcium Arsenate	10.3	450	80%	One-fourth
Lead Arsenate	5.0	220	80%	One-fourth

Table 4. General tolerance of turfgrasses to a few commonly used pre-emergence herbicides.

Chemical	Rates lb. ai/A	Turfgrass Injury Ratings[1]				
		Bermuda	Zoysia	Blue	Fescue	Greens
			Emerald	Kentucky	Red	Bent
Dacthal (DCPA)	10-20	1	1	1	1-3	1-3
Trifluralin (analog: Benefin)	1-4	1-2	1-3	2-4	2-4	2-4
Tupersan (Siduron)	16-24	1-3	1-2	1	1	1-3
Betasan (R-4461) (Pre-San)	10-15	1-3	1-3	1	1	1-2
Zytron DMPA	10-20	1	1	1	1-3	1-3
Azak (H-9573)	10-15	1	1-3	1-2	1-2	1-2
Bandane	40-60	1	1	1	1	1
Chlordane	60-90	1	1	1-2	1-2	1-2
Calcium Arsenate	350-550	1	1	1-3	1-3	1-3
Lead Arsenate	200-250	1	1	1-3	1-3	1-2

[1]Injury Ratings: 1 = no injury; 5= complete kill.

California tests for

ELM LEAF BEETLE CONTROLS

Researchers find carbaryl gives best protection

By **C. S. KOEHLER,** Associate Entomologist, University of California, Berkeley

and **R. L. CAMPBELL,** Assistant Professor, Ohio Agricultural Research and Development Center, Wooster

Skeletonization of foliage is caused by beetle larvae.

THOUGH lacking the stature which the American elm has in the midwestern and eastern states, elms in the western states are among the more common and more important shade trees in many municipalities. The principal species which have been planted are the Asian and English elms. Like their counterparts in most sections of the country, these trees are frequently heavily attacked by the elm leaf bettle, *Pyrrhalta luteola* (Muller). This insect is of particular significance in municipalities located in the high desert areas of the West owing to the widespread planting of the elm there and because of the real need for the shade provided by foliated trees in those hot, dry regions.

Although the elm leaf beetle has been in the West for many years, relatively little experimental work has been conducted here on methods of controlling it. Insecticide tests were therefore established in Inyo County, Calif., to gain this information.

Timing of Application

To determine the optimum time for spraying for elm leaf beetle control, sprays of carbaryl (Sevin) and methoxychlor, each at a dosage of 1 lb. of active ingredient per 100 gals. of water, were applied to different groups of Asian elms on four dates between May 15 and July 22. No tree was sprayed more than one time. On August 24, after all elm leaf beetle activity had ceased for the season, the trees were evaluated for insect injury using the following procedure: three persons examined each tree and independently noted the amount of feeding damage. Each individual then scored the tree on a numerical basis from 1 to 4. A value of 1 represented no feeding, or only very light feeding injury, and a value of 4 represented severe feeding damage. Intermediate damage was rated 2 or 3 depending on the severity. The values for each tree were then totaled and divided by the number of observers to give an average injury rating for each tree.

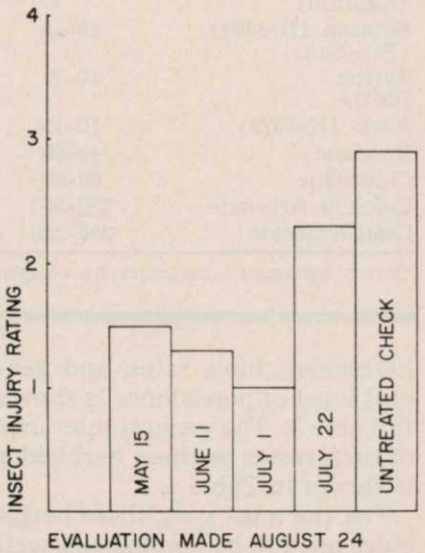

Figure 1. Injury ratings made Aug. 24 on elms treated at dates shown with 1 lb. of carbaryl per 100 gals. of water.

The results with carbaryl (Figure 1) show that the severity of insect injury decreased as the date of spraying progressed from May 15 to July 1 but increased thereafter. Treatments made too early apparently do not leave sufficient residue to last until needed for effective control of the larvae. Also, if elms are rapidly growing at the time an early treatment is made, foliage which appears after spraying will not be protected and consequently will be damaged by the larvae. Treatments made too late, on the other hand, do not protect trees from the early larval feeding. The low level of beetle injury found on trees sprayed on July 1 showed that a single application, timed properly, was sufficient to control the first generation of insects and adequately protected the trees from serious injury by the second generation which occurs in Inyo County.

Although methoxychlor was included also in the experiment, the emulsifiable formulation used resulted in injury characterized by a yellowing of the leaves and by partial, premature leaf drop. Because of this injury,

it was difficult to exclude personal bias from the injury ratings; for this reason, the ratings on the methoxychlor-treated trees are not shown in Figure 1.

Evaluation of Insecticides

Four different insecticides which are commonly recommended for elm leaf beetle control in various parts of the United States were applied as sprays to different groups of Asian elm trees in a different location in Inyo County on June 11. On that date the beetle larvae were present on the trees and their feeding damage was beginning to appear. On June 30, fifty shoots on each tree were examined and the number of first generation elm leaf beetle eggs and larvae were counted.

The results (Table 1) revealed that there were no statistically significant differences in the control afforded by methoxychlor, carbaryl and DDT, or between DDT and malathion. All treatments, however, were significantly better than the untreated check. In this experiment emulsifiable methoxychlor again caused injury to the foliage.

Insect injury ratings made on the trees in this experiment on August 24 (Figure 2) indicated that carbaryl performed more satisfactorily than any of the other insecticides under consideration. Again, since these ratings were made after all

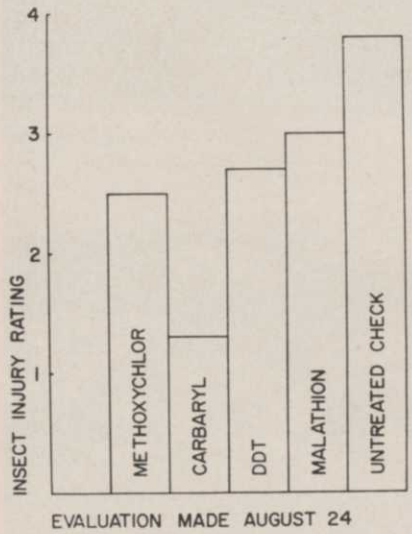

Figure 2. Injury ratings made Aug. 24 on elms treated June 11 with 4 insecticides, all at 1 lb. a.i. per 100 gals. of water.

Applying carbaryl at the optimum time gave good foliage protection. Photo taken Oct. 6.

beetle activity had terminated, it was clear that a single application of carbaryl made after the majority of the eggs had been laid in the spring, and at the time the young larvae were beginning to feed, had satisfactorily protected the trees from injury for the entire season.

Protection Is Practical

A single hydraulic spray applied at the optimum time from the standpoint of insect development did not prevent all elm leaf bettle damage. However, the feeding of the adults early in the season, and the feeding of the newly hatched larvae, were relatively unimportant and did not justify the application of very early season sprays. Results of the field experiments confirmed that it is both possible and practical to protect individual trees with carbaryl and that it is not essential that all trees in an area be treated. Of course, only the sprayed trees will be protected.

Spraying of individual trees with carbaryl or any other insecticide will not alleviate the nuisance created by adult beetles as they leave unsprayed trees and seek the shelter of homes and other buildings for overwintering purposes. A community-wide spray program is the only approach to that particular problem.

Wide variations in elm leaf beetle development commonly occur—even from one section of a county to another. This will seriously influence the proper spraying date. Unlike Inyo County, some areas in the West have more than two generations of the elm leaf beetle each year. In such areas, it is not known whether a single spray application will adequately control the insect.

In some cities in California where carbaryl has been applied to elm trees for the control of other insects, serious spider mite infestations developed on the trees following the spraying. While this problem was not encountered in the Inyo County trials, the addition of a miticide to the spray tank containing the carbaryl is suggested where there is precedent for this problem.

Table 1. Evaluation of insecticides for control of the elm leaf beetle. Inyo County. 1964.

Material[1]	Formulation	Active toxicant in lbs./100 gals.	Average number eggs and larvae per 50 shoots on June 30[2]
Methoxychlor	emulsifiable conc.	1.0	0.25 a
Carbaryl (Sevin)	wettable powder	1.0	0.75 a
DDT	wettable powder	1.0	5.50 ab
Malathion	emulsifiable conc.	1.0	22.00 b
Untreated	—	—	96.75 c

[1] Sprays applied June 11.
[2] Means followed by the same letter are not significantly different at the 5% level.

How Maryland Uses "Manatee" to cut WATERCHESTNUT

By
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WATERCHESTNUT has infested Maryland tidewaters since World War I. It first became a real nuisance about 1923 when a large patch was observed in a Potomac River tributary near Alexandria, Va. By 1933, an estimated 10,000 surface acres were covered, posing such a hindrance to navigation that Congress allotted funds for waterchestnut control. The appropriation, however, covered only the Potomac River and its tributaries. Waterchestnut has since been found in some upper Chesapeake Bay tributaries, but these infestations are held in check by the State of Maryland.

Waterchestnut Has Great Reproductive Potential

Waterchestnut (*Trapa natans*) is an annual and grows only from seed. Each seed may produce as many as 10 or 15 rosettes, which float on the surface like water lily leaves. Each rosette, in turn, can yield as many as 15 or 20 seeds. This gives the plant a great reproductive potential, which, fortunately, is seldom realized.

Sometimes, the rosettes are so crowded they cannot lie flat on the water; the leaves are crammed together and stand upright. Even in less dense areas, boating, fishing, and swimming are impossible. It is very difficult even to paddle a canoe through a thick bed of waterchestnut.

Rosettes consist of up to 50 toothed leaves crowded together on the thickened, stalklike end of each branch. Leafstalks (petioles) are long and swollen with spongy tissue. Flowers grow on short stalks at the base of some of the leaves, the lower flowers producing seeds while the upper ones on the rosette are still in the bud stage. The heavy seeds begin to ripen and drop from their stalks in mid-August; they sink immediately to the bottom and sprout the following May.

The seed sends out a stolon from which several stems sprout, and each stem may branch several times. Stems are tough and slender, $\frac{3}{16}$ in. thick, and may grow as long as 15 ft.

Clusters of rosettes from a single plant may cover an area 10 ft. in diameter if they are not crowded. Green submersed leaves grow opposite each other on the stem. Their needlelike leaflets are borne on midribs sometimes as long as 8 in. The long roots of waterchestnut are rose-colored, unbranched, and sprout from the underwater stems at the nodes.

Fully matured seeds, about the size of hickory nuts, have four sharp barbed spines, which are strong enough to penetrate thin shoe leather. When dead, the seeds float and often congregate

Waterchestnut leaves float on the surface, hindering navigation and water sports.

"Manatee", underwater weed cutter, clips waterchestnut 8 in. below water surface. Conveyors dump harvest into a large basket that holds over 100 cu. ft. of the water weed.

at beaches, creating a barbed hazard for barefooted swimmers.

We are not certain how the plant spreads. Rosettes cut from their stems carry seeds for long distances, but an abscission layer, or break joint, that would allow rosettes to break free from the underwater stem without some severe disturbance hasn't been found. The spread of new plants, though, indicates that seeds are waterborne, probably on the rosettes. New infestations are usually found in the very shallow water at the top of marshy areas or in thick beds of aquatic weeds. The barbs on the spines can very easily attach to animal fur, and this may account for the spread of the plant to some areas.

Maryland authorities are concerned about lasting control of waterchestnut because the plant can thrive at depths of 15 ft., even after the rosettes have been cut off.

Extended Controls for Twelve-Year-Old Seeds

Because waterchestnut reproduces only from seed, it is possible to eradicate the species from an area by destroying the plants before they have set seed. However, the seeds can remain alive for at least 12 years, which means that complete control is necessary for that long. To date, most control measures have been mechanical, but testing with various chemicals is underway.

The first control attempts were made by the Corps of Engineers in the Potomac River back in the early 1920's. Rosettes were cut from their stems and allowed to float in the tidal currents to salt water, where they were apparently killed. Rosettes were cut with commercial and homemade weed cutters, and after 10 years of annual cutting, the infestation was reduced to a very low level. But the species was never completely eliminated from the Potomac system. The Corps still sends a crew of men into the field each year to hand-pull whatever plants they can find. In the summer of 1965, they pulled 41 plants, roughly the number removed annually by hand for the last six years.

In 1955, large patches of waterchestnut were discovered in the Bird River, a tributary of the Gunpowder River. The Maryland Departments of Game and Inland Fish and Tidewater Fisheries initiated a program to control the floating pest in the Bird River. Both Hockney underwater cutters and 2,4-D were used. After seven seasons of work, the project ended with the weed seemingly eliminated.

Then, in 1964, several large patches covering two or three acres were again discovered in the Bird River, and a rather severe crop of waterchestnut turned up in the Sassafras River. The greatest concentration was in Turner's Creek, a tributary of the Sassafras. A limited effort was made in the summer of 1964 to control the chestnut with cutters and chemicals, but previous commitments prevented an all-out effort at that time.

"Manatee" Joins the Team

In 1965, a full-scale project began to eradicate waterchestnut from the Sassafras water system. An aquatic weed harvester and transport barge were purchased from the Aquatic Controls Corp. of Hartland, Wis. The harvester, dubbed the "Manatee," is carried on an 8 ft. by 20 ft. barge. Its cutting head is 10 ft. wide and adjustable to depths down to 4½ ft.

A series of wire-mesh conveyor belts dumps the cut weeds into a large basket at the back of the craft. The basket, which holds more than 100 cu. ft., is emptied onto the deck of the transport barge. This 8 ft. by 24 ft. barge also has a conveyor belt that runs along the deck and feeds an elevator belt at the bow, enabling us to dump the cut weeds into a truck or on shore above high tide. The Manatee can enter and leave the water under its own power since its front wheels are power driven, both machines being

Waterchestnut first became a real problem in Maryland tidewaters in the early 1920's. Infestations spread under incomplete control measures until it took an all-out effort, here described by author Elser, to harness the weed and clear the waterways.

equipped with wheels for towing over land.

The Manatee cuts waterchestnut best when the cutter head is lowered about 8 in. into the water. Since a mass of rosettes is rather fluffy and unmanageable, some fall back into the water, so we have a skiff follow the harvester to pick up overboard plants.

Harvest Storage: a Problem

At first, we carried the cut weeds on the transport barge from the Manatee to the shore where they were dumped above the high tide line. However, we couldn't stack the plants out of reach of the next high tide, which carried some away again. It became necessary to hold the cut rosettes at a dump site. Because of the large area vulnerable to new infestation, and because floating rosettes carry seeds for long distances, we installed a semicircular chicken wire fence along the shore for a dump area. But, at very low tide we couldn't get close enough to the fence to deposit the plant material, and at very high tide some of the plants drifted over the top of the barrier. We then tried snow fencing that was formed into a circle and pushed into the mud floor of 2-ft.-deep water. At very high tides, however, the entire mass of plants floated over the top of the fence.

Eventually, we found a satisfactory solution to the disposal problem. We made a square frame of 2 by 4's, 12 ft. long, and nailed a 50-ft. roll of snow fence on the outside of this with the fence staves extending 1 ft. above the framework and 3 ft. below. Placed in the water and anchored by a stake, the bin formed a "bottomless pit" capable of containing an enormous amount of plant material.

When a mass of plants is confined in the pit, it dries on top and rots on the bottom in the water. In about a day, the plant mass is reduced to only a fraction of its original volume. This process allowed us to fill the pit every day. In spite of its almost infinite capacity, several of the "bottomless pits" were built since, on days when cutting was going well, a single bin could become overloaded. Plant material could not escape from above or below the bins because they followed the high or low water level. After two or three weeks of drying and rotting, the plants became so tightly matted that we could anchor the plant mass by staking through its center into the bottom of the stream. The bin was removed and the weedy flotilla left to rot while we used the bin at another operating site.

"Bottomless pit" proved the solution to disposing of the harvest. Disposal bin of snow fence tacked to a 12 ft. square frame rides with the tides and has an almost limitless capacity. Cut, trapped weeds rot in two to three weeks, then bin is removed.

Single Plants Picked With Ten-Foot Pole

Waterchestnut infestations vary in size from single, widely scattered plants to dense mats covering many acres. The Manatee can work efficiently only on the large patches, because the machine is too clumsy for sharp maneuvering where plants are scattered. The solitary plants are best controlled by hand pickup. This operation is just what it seems, that of picking the rosettes by hand, generally with the aid of a rake or other tool. We found the best tool was an apple picker at the end of a 10-ft. pole.

Three two-man crews worked on waterchestnut pickup during the summer of 1965, with one of these following the Manatee and the others handpicking. The crews used 16-ft., flat-bottomed boats made of plywood. Boats had no center seat so that large loads could conveniently be carried. They were powered with 9½-hp. outboard engines, which were mounted on adjustable transoms and rigged with weedless propellers. With these craft, we were able to cut through heavy weed beds and travel through as little as 3 in. of water.

Infestations too scattered for the Manatee and too dense for hand pickup presented a problem difficult to solve. We tried a smaller cutter, the "Manette" by the same maker, which cut the waterchestnut very efficiently, but wasn't equipped to remove weeds from the water. Finally we compromised: we used the Manatee on patches that were really too small for it and handpicked even moderately large patches. We are now planning to use a custom-made cutter designed for operation on the in-between infestations.

Rosettes Seed After Cutting

To see if rosettes would continue to develop after they were cut from the stem, a "bottomless pit" was used to confine tagged rosettes in the water. We found that plants which were cut before the blossoms had matured continued to develop and produced normal seeds. These results con-

firmed experiments that have been carried out in New York State and justified the use of "bottomless pits" to keep rosettes from floating away after they were cut.

Plant Shows Fourfold Annual Increase

In 1964, we were able to work only some two weeks on the waterchestnut problem. Of 100 acres in the Sassafras River system, we cut about 30 acres in Turner's Creek at that time. By June 1965, only scattered plants marked the areas cleaned out in 1964, whereas the uncut areas were covered with dense mats of waterchestnut. We estimated that the infested area increased about four times in the untouched portions of the creek. If this was an accurate estimate, it indicates that three-fourths of the chestnut must be destroyed each year just to hold an infestation at status quo.

Salt May Halt Regrowth

In mid-July 1964, new growth appeared at the surface less than a week after cutting. These rosettes were small and did not set seed. In 1965, however, there was almost no regrowth. We think that the salt content of the water may have prevented regrowth in 1965, although we were not able to detect salt in any part of the Sassafras system. Frequent measurements by various agencies show that salt content of the Chesapeake Bay has been increasing for three or four years; by September, salinity in one fresh-water area on the Susquehanna flats had reached three parts per thousand (ppt.). In August, we found rather heavy sets of barnacles in most of the tributaries of the lower Sassafras, and these barnacles cannot survive in water with less than 4 ppt. salt.

On waterchestnut we had not yet cut, the outer leaves of rosettes turned brown and fell off. Many of the stems rotted and remaining rosettes floated away with their seeds. In the summer of 1965, we cut some 180 acres of chestnut; the salt water intrusion, we believe, finished the job for us.

Need More Data on Pesticide Risks, Maryland U. Conferees Are Advised

"We have some information on the risks involved in the use of pesticides, but we need more," Dr. J. E. Dewey, of Cornell University, Ithaca, N.Y., told delegates to the Sept. 27-28 Northeastern Arborist-Nurserymen's Pesticide Application Conference at the University of Maryland, College Park.

Dr. Dewey noted that continued employment of pesticides is a must, but cautioned that the safest chemical that will do a given job adequately should be used. He called for increased emphasis on the use of sprays rather than dusts, and on use of more carbamate and organic phosphate pesticides which leave less residue than some others.

Attended by more than 75 arborists, nurserymen, pesticide coordinators, and others, this was the third in a series of custom applicator schools sponsored by the University of Maryland and the Northeastern Pesticide Coordinators.

Program speakers included Dr. John A. Weidhaas, Cornell University entomologist, who talked on "The Chemical Aspects of Shade Tree and Nursery Insect Control"; Horace Webster, National Park Service plant pathologist, who described municipal pest control in the Capital region; Dr. Charles W. McComb, University of Maryland entomologist, who headed a session on "Recognition of Some Important Insects of Shade Trees and Their Control"; Dr. Edward Duda, of Bartlett Arboretum, Stamford, Conn., who discussed "Hydraulic Application of Pesticides"; and Dr. James L. Brann, Jr., Cornell University entomologist, who covered "Some Factors Affecting Air-Blast Sprays."

Highlight of the two-day meeting was a guided tour of the 415-acre National Arboretum, in Washington, D.C. Participants viewed plant research projects and discussed measures used at the Arboretum to control pests of trees and shrubs. Anyone interested in additional information on the conference series should contact chairman David Shriver, chemical-pesticide leader, Department of Entomology, University of Maryland, College Park, Md. 20742.

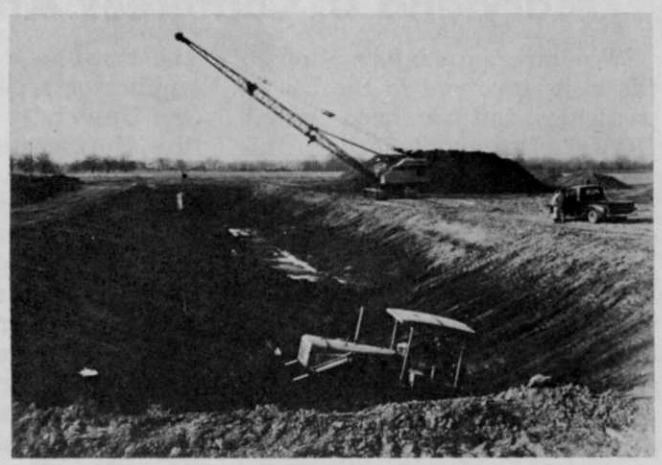
Centrifugal Spreader Gives Speedy Broadcast

The Diadem centrifugal fertilizer spreader is capable of broadcasting all types of fertilizers, lime, seed, granular herbicides and insecticides with precision in one-fifth of the time ordinarily required, according to The Vandermolen Co., North Caldwell, N.J., which has introduced the equipment in the U.S.

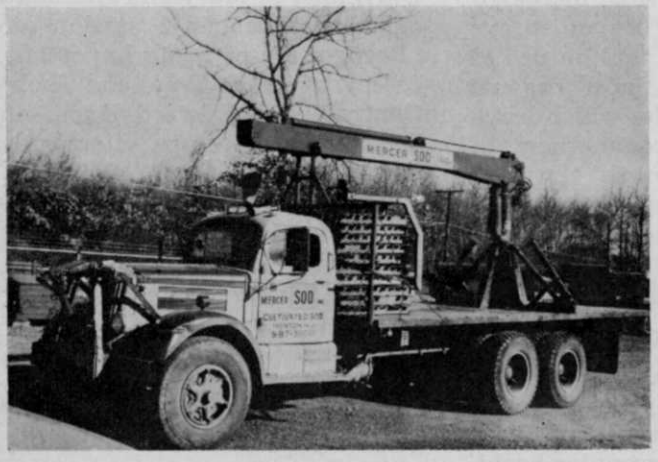
Diadem can cover up to 12 acres per hour with even swaths of 35 ft. and more, Vandermolen says. Spinner disk, scoop blades, and feed outlets are designed and matched to provide uniform placement of all types of material. Tractor speeds up to 10 m.p.h. can be used, and a simple adjustment will vary coverage from 9 lbs. to 2,600 lbs. per acre.

The Diadem spreader's conical steel hopper has a 700-lb. capacity. Spinner assembly and setting controls can be removed without the aid of tools for quick cleaning of parts. For complete information and illustrated literature on the equipment, which is manufactured in West Germany, write to The Vandermolen Co., 378 Mountain Avenue, North Caldwell, N.J. 07006.

Diadem centrifugal spreader holds 700 lbs. of fertilizer, seed, or herbicide, spreads at speeds up to 10 m.p.h.



Drainage ditch being cut (right) will flow into one of three reservoirs. All work except heavy excavating is done by Mercer.



Outfitting all trucks with boom loaders (left) has expedited shipments, reduced cost of unloading palletized sod.

Reservoirs Overcome Drought For New Jersey Sod Grower

By ALBERT S. KESHEN

Only by installing a network of reservoirs and drainage ditches has an expanding New Jersey sod farm been able to overcome the serious drought condition that faces the Northeast. Mercer Sod, Inc., began to grow sod about 15 years ago on 140 acres of poorly drained land off Route 206 in Springfield Township, N. J. Today, in spite of a heavy clay soil that once supported only poor crops of soybeans, corn, and hay (and even these used to be under water for three or four months at a time), Mercer has increased its productive land to nearly 600 acres.

One of 25 or 30 sod farms in a blossoming, $5 million New Jersey industry, Mercer's sod operation started as an offshoot of the Mercer Contracting Co., landscape contractors. Much of the sod produced goes into Mercer's landscaping jobs, and the company considers itself one of the largest turf contractors in the state. The four brothers who own and operate the two businesses, Frank, Dominick, James, and Victor Cacavio, readily admit that their rapid expansion has been made possible by improvements in the water situation, together with increased reliance on mechanization and the advantages of conducting a diversified operation. They credit a good part of their growth to the U. S. Department of Agriculture's Soil Conservation Service, which helped plan their drainage and irrigation system.

Three Irrigation Ponds Collect Water

When the Cacavios began to grow sod back in the early '50s, they called upon Soil Conservation technicians to design several drains to get rid of excess water standing in surface depressions. Results were so impressive that the owners decided to cut shallow, V-shaped, grass-lined drainage ditches in each field, and also to perform additional shaping and grading of the land so that water readily flowed into the ditches.

"We had to rely completely on surface drainage because our soil is so heavy," Victor Cacavio says. "The S.C.S. people came up with a plan to run the ditches into one end of each of three irrigation ponds and out the other end. This way we keep as much rainwater on the farm as we can without ruining the sod. They also suggested several diversion channels to run crosswise on our 40-acre sloping field to stop the lower half from eroding after we cut sod. We now find that these diversion channels also keep water off our low, flat areas."

For the irrigation system, three ponds have been constructed and a fourth is planned. All construction on the drainage-and-reservoir system, except for the actual excavation of the ponds, was done by Mercer, which uses heavy earth-moving equipment in its landscape operations. Ponds are 70 ft. by 400 ft. by about 20 ft. deep, and are centrally located in the fields to reduce the amount of irrigation pipe required.

Shallow ditches are spaced about every 200 ft. apart in the fields. These drain into the main ditches, which in turn drain into and through the reservoirs. When the reservoirs have reached capacity, about 2 million gals., excess water overflows into ditches on the other side, preventing a backup of water in the sod fields. From reservoirs, three irrigation pumps, capable of handling 750

gals. per minute each, pump water through the main lines to portable 4-in. laterals. By the use of a "wheel move," hooked up to a series of pipes, one man can move up to 1,700 ft. of pipe without help, another of Mercer's labor-reducing innovations.

As new land is put to work cultivating sod, Mercer is continually expanding its drainage and irrigation system. More than 24,500 lineal ft. of V-shaped ditches have been constructed in the past year alone. With the continuous flow of water from ditches to reservoirs to irrigation lines, surface water is no longer a serious problem on the farm and adequate water is available for necessary irrigation. "Our sod farm is an outstanding example of what can be done with land which is affected by a serious drought situation," the four brother-owners echo with pride.

Drainage System Serves Field Grading and Roads

All the earth dug from ditches and ponds on the farm is used to shape and grade the sod fields. The grading serves a twofold purpose by permitting even distribution of irrigation water along with the drainage benefits. A factor that had to be considered when putting in the drainage system was the farm's network of well-graded roads, designed to permit heavy trucks to get as close as possible to each sod cutting site and to permit loaded trucks to pull out without becoming bogged down.

Drought in the Northeast, together with a heavy clay soil and serious drainage problems threatened Mercer Sod Farm's production. Today, Mercer has quadrupled its acreage and production is booming.

"Our operation is geared to top efficiency and we eliminate as much hand labor as possible," Victor Cacavio explains. "We can't make a profit hand-carrying strips of sod long distances, or pulling trucks out of the mud. The Soil Conservation Service people took this into consideration when they planned the original drainage layout and also when we bought additional ground."

Some time ago, the firm decided to initiate an efficiency program calling for greater mechanization. One of the first steps was to install Side-O-Matic unloaders on their fleet of trucks, which includes both medium-size vehicles for nearby deliveries and tractor-trailers for long distance sod hauling. Trailers can handle 8,000 to 10,000 sq. ft. per load. Mercer's total delivery capacity is up to 70,000 sq. ft. of sod per day. To match this delivery capability, sod harvesting had to be speeded.

Ryan sod cutters are used to cut sod into 1-ft. by 4-ft. strips, which are then hand-loaded onto nearby pallets. Forklift tractors transport the pallets to delivery trucks, which can be pulled in close because of the road network. Mercer figures that four to six men are eliminated by this type of operation, and loading is much faster. By the use of unloaders, the time and labor savings also extend to delivery of the sod. Since no hand labor is involved in the unloading process, handling of sod is minimized. Drivers can now load and unload in about 20 to 30 minutes, as compared to two to three hours for handwork with four to six men per truck.

Sod Farm Geared to Diversified Operation

Mercer Contracting Co. is, quite naturally, the sod farm's best customer. The landscaping contractor purchases from outside sources all the shrubs, flowers, and other plantings needed for its projects. But, because of its sod farm, the company is often called upon for consultation when projects calling for extensive turfgrass areas are planned. Turfs of Kentucky bluegrass-fescue mix, Merion bluegrass-Kentucky bluegrass-fescue mix, and straight Merion have been sodded throughout New Jersey by the contractor. Mercer Sod Farm also retails sod and sells to other nurserymen-contractors.

In its landscaping work, Mercer is geared to perform the complete operation, starting with clearing and grading, on to placing of topsoil, sodding or seeding, planting, and mulching. Specialized equipment, such as earth borers and hydraulic seeders, gives the organization large-job capability. "Such capability for covering the entire field of landscaping enables us to take on more work, and makes us more adaptable for all phases from layout to follow-through than the split operators," James Cacavio says.

He also points out that another important advantage of such a comprehensive setup is that the

Brother-owners of Mercer Sod Farm and Landscaping divide management duties. Shown here (left to right) are Victor, Frank, and Dominick Cacavio. Missing from photo is James.

company can function throughout the entire year with minimum layoffs of personnel. During winter months, Mercer keeps all of its key men busy with snow removal and equipment maintenance, and does its project planning then so no work time is lost. As a result, it can function as a year-round working force instead of a seasonal force, as do most of the nearby contractors. A crew of 80 to 125 men is employed on projects and another 15 on the sod farm, with some exchange of personnel to meet peak requirements. Of the farm crew, eight men are employed year-round, with the others assisting during the April-to-October cutting season.

Brothers Split Management Duties

Mercer Contracting Co., parent organization of the Mercer Sod Farm, was established in 1948 by the four Cacavio brothers, who began as small nurserymen and landscape contractors and have gradually extended the scope of their operations. The managerial duties are divided among the quartet, with Dominick as project manager, Frank in charge of the sod farm and maintenance, James as general manager, and Victor as field supervisor and expediter.

All of the company's operations are carried out from the central yard and office building, which covers about 30 acres in Trenton, N. J. In back of their one-story office building is the garage, which houses over 100 pieces of equipment, including tillers, harrows, mulching machines, equipment trailers, graders, scrapers, hydraulic seeders, mowing equipment, dump trucks, some 15 tractors, pickup trucks for the use of supervisory personnel, loaders, and four dozers.

Mercer belongs to the New Jersey Nurserymen's Association, Landscape Information Service, Landscape Contractor's Association, and the Cultivated Sod Association of New Jersey, of which Frank Cacavio is vice president.

Experts Advise How To Ready Trees and Shrubs for Winter

Trees and shrubs will better withstand the ravages of winter if watering is discontinued until the leaves have fallen, C. M. Drage, Colorado State University extension horticulturist, advises. Late-season watering produces soft or succulent wood that is susceptible to winter injury. Conifers and the main stems of broadleaf plants are particularly vulnerable.

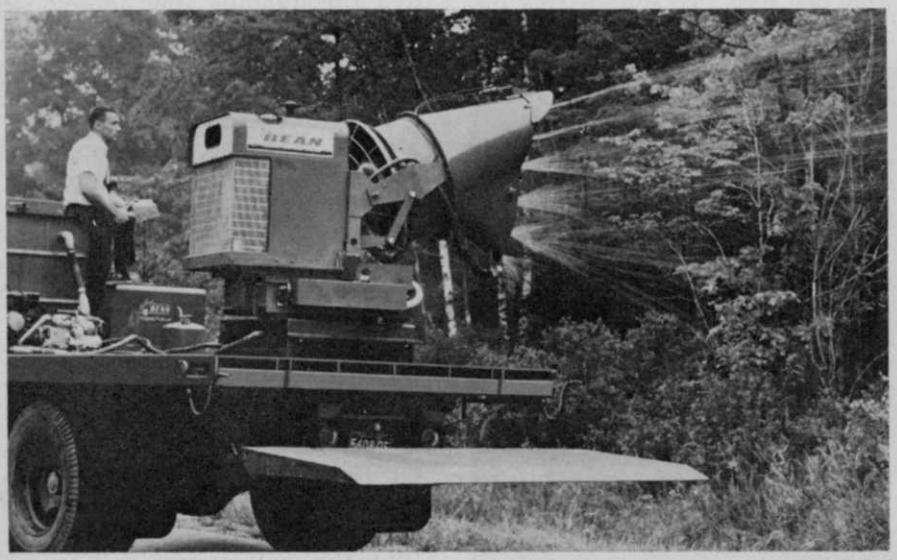
Conifer damage is usually apparent on the southwest side of the foliage. Arborvitaes are also liable to be damaged by winterburn. This problem is caused by rapid temperature changes, Drage points out. Researchers say that leaf temperatures on a sunny winter day may exceed 70 degrees even though air temperature is below freezing. When the sun sets, leaf temperature drops quickly with resulting injury. Main stems and leaves of deciduous trees often show symptoms of frostcracks and sun-scald during the winter, he adds.

Wrap Thin-Bark Trees

James Nighswonger, extension landscape architect at Kansas State University, recommends wrapping the trunks of such thin-bark trees as sugar maple, tulip, American linden, flowering dogwood, and magnolia with a commercial tree wrapping to prevent winter sun-scald. Wrapping should be removed when the weather warms in the spring. Nighswonger also suggests applying a wilt-preventative spray to broadleaf evergreens to reduce leaf drop and winter damage.

Mulches around the base of trees and ornamental plants will help get them through the cold weather in good shape, the experts say. Nighswonger suggests using wheat straw, leaves, pine needles, shredded bark, and even peat moss if the site is protected from the wind. Advising against the use of grass clippings for mulch, he adds that mulches should be about 4 to 6 in. deep and should stay where they are placed without being compacted. Mulches should not be used until after several hard freezes have occurred. Mulching reduces the loss of moisture and moderates the alternate freezing and thawing of soil that is a prime cause of winter damage, the extension landscaper concludes.

The experts advise thoroughly soaking the soil around plants with water before freezing sets in. Drage adds this hint: overfertilized trees are especially susceptible to winter injury; fertilize only in the early spring.



Broadcast pattern spray head introduced by John Bean, is shown here operating from hand-held remote controls. The attachment, called "Rotocast," is powered by a 4-cylinder, air-cooled engine, and can discharge 10 to 40 gals. of spray per minute at 40 p.s.i. Remote controls rotate the sprayer 210 degrees horizontally. Air stream is adjustable through an arc 45 degrees downwards and upwards. More complete specifications can be obtained by writing for Catalog L-1496, to John Bean Division, Box 9490, Lansing, Mich.

Turfgrass Tolerances Do Differ

(from page 7)

ing bentgrasses, particularly at the higher rates.

The use of trifluralin is declining since injury to all types of turfgrasses has been reported often enough to question its safety. It also has a very narrow safety margin for application. However, a recent analog of trifluralin, benefin, offers promise for improved safety on turfgrasses while at the same time giving good control of annual weedy grasses.

Herbicide Selectivity Calls for Careful Usage

Some herbicides exhibit considerable selectivity. Tupersan is one of these. It exhibits a high degree of safety on some grasses but causes serious injury to others. This chemical has appeared safe on newly seeded bluegrass, perennial ryegrass, and creeping bentgrasses, such as Penncross, Seaside, C-1, C-7, C-19, and Highland and Astoria colonial bentgrasses. Mature turfs of red fescue, Kentucky bluegrass and a few creeping bentgrasses show good tolerance, yet warm season grasses such as the bermudagrasses have been severely injured. This chemical has not yet been recommended for use on golf putting greens.

Another herbicide which has caused injury on bermudagrasses and zoysiagrasses is Betasan. This chemical, like tupersan, tends to be safer on cool season turfgrasses. Betasan gives excellent control of annual bluegrass in bent greens with little or no serious injury to the bentgrass. Treatments for annual bluegrass in bentgrass greens should be made in late summer to early fall and again in early spring.

Two excellent herbicides for general turfs are Zytron and Azak. At recommended rates these chemicals are safe on most turfgrasses but can cause some injury to bentgrasses. They are not normally recommended for use on bentgrass greens.

Bandane and chlordane are two herbicides which are usually safe on turfgrasses. Due to their tendency to persist and build up to toxic levels under droughty conditions, the turf should be adequately irrigated throughout the season following their use.

Two preemergence arsenical herbicides which have been available for several years are calcium arsenate and lead arsenate. Although bermudagrasses show good tolerance to these herbicides, cool season grasses can be easily injured. These inorganic arsenicals are not recommended for use on St. Augustine or around ornamental plants with shallow roots. They are good herbicides and give a high level of persistence for a second year's control of annual weedy grasses. They give good control of annual bluegrass. Lead arsenate is still favored by many golf course superintendents for the control of annual bluegrass and crabgrass in golf greens.

The important fact to remember in using any herbicide is to apply it at the correct rate at the proper time. Use an herbicide only on a turfgrass known to be tolerant to it and read the label and follow the directions precisely.

Friend Announces TracTank Sprayer

The TracTank Sprayer, a new compact sprayer for herbicide application, was recently introduced by Friend Mfg. Corp. It can be used with 2- or 3-point hitch tractors and is effective for weed and brush control, while a specially designed tree boom provides swath or individual tree base herbicide application, the company reports. Available with 2- or 4-cylinder plunger-type pump, the sprayer features a mechanical agitator for its 100-gal. epoxy-lined tank, and is said to have the easiest pickup and dropoff operation in its field.

Specifications and more information on the TracTank Sprayer will be sent WTT readers who ask for them from Friend Manufacturing Corp., Prospect St. & East Ave., Gasport, N. Y. 14067.

Featured speakers, Mitchell Wrich (left), and Professor F. L. Steve O'Rourke (right), pause at the arboretum during the shade tree course to talk with C. Gus Hard, extension horticulturist at the University of Minnesota, host for the meet.

Minnesota Shade Tree Course Stresses Planning Before Planting

"Nurserymen, arborists, city planners, and park managers should coordinate their efforts more than they do now if we are to realize the goal of unified horticultural programs," Professor F. L. Steve O'Rourke told an audience of 220 at the University of Minnesota's Fifth Annual Shade Tree Maintenance Short Course, held at the University Arboretum, Sept. 20.

Speaking on various aspects of tree programs, particularly in cities and parks, O'Rourke maintained that dialogue between planners and nurserymen is too often lacking. "Planners often do not give nurserymen sufficient lead time to provide desired trees." He advocated long range planning and contract arrangements that would allow nurserymen time to acquire stocks of clones for street and park planting. O'Rourke, horticulturist from Iowa State University, Ames, and Mitchell Wrich, of Chemagro Corp., Kansas City, Mo., were featured speakers on the shade tree program.

Arborist's Image

"In many places, the image of the arborist and nurseryman has been hurt by unscrupulous or unqualified persons," O'Rourke said. Calling upon arborists to establish standards for superior workmanship and a code of ethics for the profession, he advised them to base prices on cost studies and make sure they have sufficient profit margins on both material and labor.

Arborists should work not only to improve their public image, but to create more public interest in tree planting programs, the Iowa horticulturist noted. Personal contact, establishment of arboretums in parks, even labeling trees in public areas, are ways to stimulate interest.

Planners and others involved in tree programs should remember, he continued, that houses have changed radically in the past 50 years; trees once suitable are hopelessly out of scale with modern surroundings. Size and shape of a mature tree, need for pruning, disease resistance, and proved adaptability are factors to be considered before making the final selection of species to plant.

Although advocating the planting of clones of the same variety and size along a particular street, O'Rourke counseled against using the same species throughout a neighborhood. "Use of different species on alternate streets helps to insure that disease will not wipe out the tree population of an entire area."

Systemics Long on Protection

Systemic insecticides, applied on the plant or through the soil, are particularly good protection against sucking insects such as aphids, Mitchell Wrich related in his discussion of new developments in systemic and low-volume, high-concentrate pesticide applications. The greatest value of systemics, Wrich said, is that one application in spring will often provide season-long protection thus freeing arborists for other tasks during the busy summer season.

Low-volume aerial applications of highly concentrated pesticides can be very effective in amounts as small as 2 ozs. per acre, Wrich told the gathering. This type of application has significant potential for control of pests such as tent caterpillars in large acreage plots and forest areas.

Sponsors of this short course are the Department of Horticultural Science and the Agricultural Extension Service of the University of Minnesota, St. Paul.

Pennlawn Superior in North, Beard Tells Mich. Turf Day

Pennlawn fescue has shown superior drought and low temperature tolerance, as well as overall quality under northern conditions, Dr. James Beard, Michigan State University turfgrass researcher, told more than 200 turf specialists at the Northern Michigan Turfgrass Field Day in Traverse City, Sept. 13.

Continuing his evaluation, Beard, who was in charge of the program, noted that Chewings, though outstanding for the first two years of trials, has since deteriorated. Common creeping and Rainier have proved very susceptible to low temperature, the turf expert commented.

Opening with a tour of turf plots, established in Traverse City because its cool climate and sandy soil is representative of turf growing conditions in many northern resort areas, the day-long program also included equipment demonstrations and discussions of turf research.

The detrimental effect of ryegrass on bluegrass-red fescue turfs is much greater in northern Michigan than in sandy loam soils at East Lansing, site of Michigan State University, Beard

pointed out. "Drier soil conditions favor ryegrass establishment, which in turn suppresses development of bluegrass and red fescue seedlings."

"Under these conditions, the resultant composition of the turf is 80% to 95% ryegrass where only 20% to 33% rye was seeded three years ago. During winter, ryegrass will be seriously thinned by winterkill, resulting in a low-quality turf," Beard concluded.

"National Policy" Theme Of February WSA Meet

"The National Policy on Weed Control" will be the theme when weed specialists from all over the country gather at Washington, D.C.'s Statler-Hilton Hotel for the 1967 annual meeting of the Weed Society of America, Feb. 14-17.

Registration will open at noon, Monday, Feb. 13, and general session and sectional meetings are slated to begin Feb. 14. Program for the '67 meet will also include a tour of the U. S. Department of Agriculture research facilities at Beltsville, Md., on Tuesday afternoon. While weed experts are discussing latest contributions to the field of weed science, a ladies program will tour places of interest in Washington.

Dr. William R. Furtick, Farm Crops Department, Oregon State University, Corvallis, is president of the society. President-elect and program chairman for the Washington conference is Richard Behrens, Department of Agronomy and Plant Genetics, University of Minnesota, St. Paul. Other officers are Dayton L. Klingman, Agricultural Research Service, Beltsville, Md., secretary; F. W. Slife, Department of Agronomy, University of Illinois, Urbana, treasurer and business manager; and E. G. Rodgers, Department of Agronomy, University of Florida, Gainesville, editor of "Weeds," the society's publication.

Further program details will be announced in coming issues of *Weeds Trees and Turf.*

Know Your Species

KOCHIA

(Kochia scoparia)

Kochia, a native of Eurasia, was originally introduced as an ornamental and is still cultivated as such under the name of summer cypress. The young plant is a dark green, turning reddish as it matures, so that it is also known as fireweed, burning bush, and Mexican fireball.

Kochia is found throughout North America having spread very rapidly in recent years. This drought-resistant, bushy plant is most common in the Plains States. Kochia grows under most soil and moisture conditions, thrives in dry, alkaline soil, and is often found in pastures, croplands, rangelands, and fields.

In the fall, the kochia plant separates from its taproot and tumbles over the ground, distributing seeds widely. Seed are a common crop-seed contaminant.

An annual plant, reproducing by seed, kochia grows from a few inches to over 6 feet tall. Smooth, green stems branch considerably (1). Numerous alternate leaves are 1 to 2 inches long and are attached directly to stems. Leaves are narrow, hairy, and pointed.

Flowers (2) are small and green, without petals. Flowers and seeds grow in axils of the upper leaves and in terminal spikes. Seeds (3) are oval, flattened, and grooved on each side. Dull-surfaced seeds are brown with yellow markings. One plant will produce over 14,000 seeds, each about 1/16 inch long.

Mowing greatly reduces the amount of kochia seed formed; however, even continuous close mowing may not prevent seed formation. Mowing should be done early before seeds mature. Young plants (under 10 inches) can be well controlled by applying ½ to ¾ pound of 2,4-D per acre. Older plants require more herbicide. Fully mature, woody plants are more difficult to control. Good results in controlling young kochia may also be obtained by using 2,4,5-T or silvex at a 1-pound-per-acre rate, or 2,4-DB at a rate of 2 pounds per acre.

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

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

Southern Weedmen Confer In New Orleans, Jan. 24-26

Nearly every aspect of weed control relating to agriculture, industry, and public utilities will be covered when southern weed specialists convene at the Jung Hotel in New Orleans, La., for the 20th annual meeting of the Southern Weed Conference, Jan. 24-26.

The three-day session is scheduled to bring together researchers and educators representing colleges, chemical companies, public health and regulatory agencies, public service organizations, equipment manufacturers, and others from 12 southern states, including Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, and Texas.

President of the Southern Weed Conference is Donald Davis, Botany Department, Auburn University, Auburn, Ala.; Robert A. Mann, Tennessee Valley Authority, Chattanooga, Tenn., is vice president; secretary-treasurer is Dr. H. Hanly Funderburk, Botany Department, Auburn University; Dr. John Baker, Louisiana State University, Baton Rouge, is program chairman; and Robert Z. Torrance, of E. I duPont de Nemours, Baton Rouge, is in charge of local arrangements for the conference.

Noncrop Weed Sessions Set For Jan. 24-26 Calif. Meet

Headlining the Jan. 25 session on noncropland weed control, D. W. Yazell, Engineer of Vegetation Control, Santa Fe Railroad, will describe the Santa Fe's "Railroad Electric Weed Spray Car" to participants in the 1967 California Weed Control Conference, Jan. 24-26, at the Hilton Inn in San Diego.

The railroad has converted two baggage cars into modern spray units, equipped with diesel-driven centrifugal pumps for weed control on trackage that runs from California to Illinois, Texas, and Louisiana. In the same session, Mike Palermo, engineering commission, 11th Naval District Headquarters, will discuss the Navy's increased reliance on herbicides to control unwanted vegetation on shore establishments, and the cost reductions that have resulted.

Other papers to be presented during this session include "Weed Control Under Asphalt Paving," by Carl F. Lind, Asphalt Institute district engineer; "Weed and Brush Control Under Transmission Lines," by C. Elmer Lee, Southern California Edison Co.'s manager of line clearing; and "A Distributor's View of the Industrial Herbicide Market," by Bob Brunner, industrial herbicide specialist for Van Waters & Rogers, Inc. F. R. Ogilvy, western regional manager for agricultural and industrial products, U. S. Borax and Chemical Corp., Los Angeles, will chair the noncrop session.

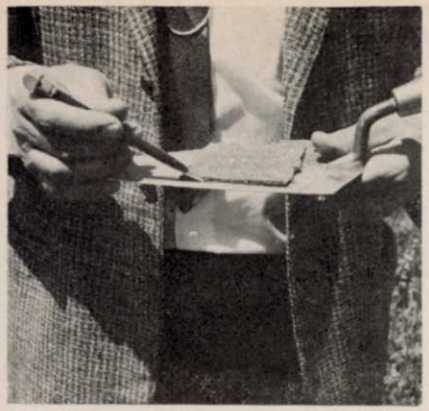
Participants in the Annual Turfgrass Short Course of the Alabama-Northwest Florida Turfgrass Assn., at Auburn University, included (l. to r.) Dr. Henry Orr, Department of Horticulture, Auburn University; Bryson L. James, technical representative, Hercules Inc., Raleigh, N.C.; Marshall Dugger, Dugger Grass Co., Tuscumbia, Ala.; and Dr. R. D. Rouse, associate director and assistant Dean Auburn University School of Agriculture. Altogether, more than 100 participants and researchers discussed problems in turfgrass management during the Sept. 8-9 meet. Speakers included James, who discussed "Preemergence Treatment for Control of Poa Annua on Overseeded Grasses"; Dr. Orr, who talked about "Trees, Shrubs and Their Care"; James B. Moncrief southeastern agronomist, USGA, Greens Section, Athens, Ga., who delved into the loss of bermudagrass on golf courses in northern Alabama; W. A. Rocquemore, Patten Seed and Turfgrass Co., Lakeland, Ga., whose topic was "Renovation and Reconstruction of Tees"; and Tom Mascaro, West Point Products Corp., West Point, Pa., who reported on problems, including soil compaction and turfgrass wear, caused by golf carts. Dr. D. G. Sturkie, Department of Agronomy and Soils, Auburn, was chairman of arrangements for the meet and directed a tour of turf experiments on fertilization of zoysia, Tiflawn bermuda, and centepedegrass. Dr. Sturkie also described new strains of bermudagrass and zoysia under test at the Auburn plots.

MSU Sees Possible Turf Uses for Subsoil Asphalt

Water holding capacity of the soil is doubled, Michigan State University scientists say, by their newly developed process for installing a thin layer of asphalt two feet under a sandy soil. Asphalt layering may prove valuable for raising turf in such locations as a sandy golf course, they point out. The asphalt layer, about ⅛ in. thick, provides an artificial barrier and allows water to be stored in the zone where it can be readily used by plants.

Developed by two M.S.U. researchers, agricultural engineer Clarence M. Hansen and soil scientist A. Earl Erickson in conjunction with the American Oil Co.'s Research and Development Department, this asphalt layering process is said to have a potential for reclaiming millions of acres of droughty, sand soils. Cost, using the researchers' experimental equipment, is about $225 per acre, but developers feel equipment and application methods can be improved and cost reduced. They expect the asphalt layer would last about 15 years.

"Roots can penetrate the asphalt



Asphalt layer, about ⅛ in. thick, is sprayed 2 ft. under the surface of sand soil by a specially designed shoe. Layering can reclaim millions of acres of sand soil, developers say.

layer," Erickson explains, "but do not emerge through the other side, since ground under the layer is completely dry and there's no reason for roots to keep on going. End result is a mat of roots which eventually begins to form right at the top of the layer. We haven't had a chance to test the full effect, but we believe it helps to build up a supply of organic matter in the soil. Besides that, the layer should help reduce leaching of important plant nutrients, especially nitrogen," Erickson adds.

Wichita Hosts N. Central Weed Conference, Dec. 5-7

More than 700 weedmen from 12 states and Canada are expected for the Dec. 5-7 meeting of the North Central Weed Control Conference at the Broadview Hotel in Wichita, Kans.

Reports on new herbicides, regulations on their use, equipment and application methods, industrial vegetation control, and all aspects of weed control are programmed for the fact-filled three-day meeting. Sections for extensioners, researchers, and specialists in other areas are also to be included. President of the conference is John D. Furrer, University of Nebraska, Lincoln; vice president and program chairman for the meeting is R. L. Warden, The Dow Chemical Co., Midland, Mich.

For further information, write G. Clare Buskirk, secretary-treasurer, North Central Weed Control Conference, 4100 X St., Lincoln, Nebr. 68503.

Book Review

Weeds of the World; Biology and Control

by Lawrence J. King, Interscience Publishers Inc., New York, N. Y., 1966, 522 pp. ill., $18.00.

With detailed descriptions of the origin and classification of weeds, this volume will interest the weed controller who is concerned not only with the "how," but also with the "why" of weed control.

It is not a reference the contract applicator will turn to often for specific herbicide recommendations (though some are included), but a readable account of the distribution and characteristics of weeds and the development of herbicides for their control. Ranging all over the world in text and diagram, the author describes the uses of weeds as well as their harmful aspects. Seed structure, growth, and reproduction of weeds, along with environmental factors are treated at length. Each chapter is concluded with an extensive bibliography detailing textual references.

Herbicides are classified and described, and their applications suggested. Data is given on the way in which herbicides act on plants and on the uses of various spray techniques and surfactants. One chapter is devoted to herbicide controls, and one to nonchemical methods of weed control. Appendices include tabular data on the properties and uses of herbicides, and brief descriptions of those recently introduced.

Readers wishing to expand their knowledge of weed biology and the various controls will benefit from this publication.

For the applicator in daily contest with weeds, whatever his problems, it may be some consolation to hear from the author that "In terms of the Darwinian concept of the struggle for existence, weeds as a class probably well represent the most successful plant forms that have evolved simultaneously with the destruction or disruption by man of the indigenous vegetation and its habitats."

"No Need to Burn Roadside Berms" Hay Tells '66 N.W. Spray-O-Rama in Portland

"Roadside spraying can be done without having many miles of roadways bordered with burned areas so displeasing to the public," Joseph Hay, director of industrial weed control for the Oregon State Highway Department, told opening-session participants at the 5th annual Pacific Northwest Spraymen's Spray-O-Rama, Sept. 23-24 at the Thunderbird Motel, Portland, Oreg.

Attacking indiscriminate spraying for roadside brush control, Hay pointed out that selection of spray materials is of prime importance to avoid "blighted" areas. Low soluble mixtures must be used in regions of high rainfall, or the spray is dissipated too quickly; conversely, lower rainfall regions call for highly soluble materials.

Hay, who is responsible for controlling some 7,000 miles of brush and weeds along Oregon roadways, also reminded spraymen that the area immediately adjoining many paved roads gets a concentrated amount of water from runoff. "It's here that an annual shot is not the answer, but rather maintenance sprays applied several times annually are needed."

Dr. Virgil Freed, head of the Department of Agricultural Chemistry at Oregon State University, Corvallis, and University extension chemist Dr. James Witt continued the session with an investigation of environmental pollution. Emphasizing that chemical residues are only one aspect of the problem, they added this should encourage spraymen to do everything in their power to be more and more versed in the complexities and uses of chemicals they deal with.

James Short, Director, Oregon Department of Agriculture, welcomed conference delegates: "I commend you for your program to promote professionalism."

Close Look at Turf Problems

"It is not uncommon to find a turfgrass area on a layer of thatch similar to an elevated peat bog," Dr. Norman Goetze, Oregon State University turf specialist, said in his discussion of turf problems common to the Northwest. Opening the Sept. 24 session, Dr. Goetze explained that, in any cool climate, thatch is an ever present problem and is most harmful where it ties up fertilizers in the thatch layer and does not allow nutrients to get down to the grass root zone. "We must get through thatch by piercing, or in some way removing it, to allow nutrients and chemicals we apply to get to the problem."

Referring to the common practice of cutting grasses at short heights, Dr. Goetze recalled that "the era of the broadleaf weed" came along with close mowing since these weeds are able to make more inroads in shorter grasses. Hot weather diseases, too, are encouraged by shorter heights. "Adding to our woes are the grassy weeds, which are extremely difficult to control because we are actually trying to control grass within grass," the turf specialist said.

On the brighter side, Dr. Goetze pointed out that "in the Portland area, soil, climate, and temperature are not particularly favorable to the development of crabgrass. Only one genuine sample from Portland has been mailed to Oregon State University in the past six years."

Joseph Hay, Oregon Highway Department weed supervisor: "It's not necessary for roadside spraying to cause roadside blight."

Dr. Norman Goetze, turf specialist, Oregon State University: "It's not uncommon to find turfgrass areas similar to peat bogs."

Ray A. McNielan, Multnomah County, Oreg., extension agent: "Enforcement of spraymen's licensing laws is in high gear."

Art Mehas, King County, Wash., extension agent: "Many calls to our office show a lack of sprayman-customer communication."

Outgoing president William Owen (right) congratulates '67 president Jack Daniels.

Licensing the Sprayer

"Too often, a sprayman studies for his license exam, passes the test, and then proceeds on an inadequate *continuing* study program," Ray McNielan, agricultural extension agent from Multnomah County, Oreg., complained. "In the future, we will see the need for more specialized, prescription-type spraying demanding a depth of knowledge that may be unknown to us at this time."

McNielan and Art Mehas, extension agent from King County, Wash., gave county agents' impressions of custom applicators they have known. "Many calls to the county agent's office indicate a breakdown in communication between the sprayman and his customer," Mehas remarked. "This situation can be prevented by a better organized person-to-person relationship between applicator and customer." As evidence of the problem, Mehas cited the extremely large turnover of customers between various spray companies.

Another problem area, seldom realized, was brought forth by Mehas when he noted that "many applicators are called on the carpet for supposed damage to plants which actually may have resulted from reactions of plant leaf surfaces to air pollutants. Being mindful of this is another way in which a sprayman can better his customer relations," the extension specialist concluded.

Spray Equipment Shown

An equipment display at the '66 Spray-O-Rama featured some 30 spray items, ranging from small pickup outfits to large (900 gal. to 1,000 gal.) rigs with several pumps. "This equipment serves best to illustrate the complexity of demand in our industry and a resultant need for versatility of application equipment and methods on the part of the 'pros' in the business," William Owen, '66 PNSA president, commented.

Spray gear was also discussed by a symposium session manned by Donald Mock, Shamrock Spray Service, Seattle, Wash.; Earl Parker, Jr., Chemical Spray Co., Dayton, Oreg.; and L. F. "Lew" Sefton, Sefton Spray Service, Portland, Oreg. These veteran spraymen agreed there is no optimum size for a given piece of equipment. It's a matter of the size and type of equipment an applicator chooses to use; one sprayman's large rig might be another's undoing, and vice versa.

"I have always found that if you can help a prospective customer, you can generally get the job to do the work for him," Ray Collier, Collier Spray Service, Portland, said in his talk on "How I Sell the Spray Business and You Can Too."

"If you show prospects what's wrong; show them their needs, and in doing so, demonstrate your own knowledge and ability, customers will come flocking to your door." This was Collier's advice to spraymen for using the "professional" approach to sell their services.

General interest speakers at the two-day meet included Del Snider, Taylor and Co., adver-

Meeting Dates

New Jersey Federation of Shade Tree Commissions, Annual Meeting, Haddon Hall Hotel, Atlantic City, Nov. 13-15.

Nebraska Association of Nurserymen, Annual Convention, Cornhusker Hotel, Lincoln, Nov. 14-15.

National Weed Committee of Canada, Western Section, Research Station, Canada Agriculture, Brandon, Manitoba, Nov. 29-Dec. 1.

Illinois Turfgrass Conference, University of Illinois, Urbana, Dec. 1-2.

Minnesota Nurserymen's Assn., 40th Annual Convention, Curtis Hotel, Minneapolis, Dec. 5-6.

North Central Weed Control Conference, Broadview Hotel, Wichita, Kans., Dec. 5-7.

Connecticut Nurserymen's Assn., Annual Meeting, Hotel Park-Plaza, New Haven, Dec. 28.

North Carolina Association of Nurserymen, Short Course and Trade Fair, North Carolina State University, Raleigh, Jan. 1-3, 1967.

Northeastern Weed Control Conference, Commodore Hotel, New York, N.Y., Jan. 4-6.

Indiana Arborist Assn., Annual Meeting, Claypoole Hotel, Indianapolis, Jan. 4-6.

Pennsylvania-Delaware Chapter, International Shade Tree Conference, Annual Meeting, Nittany Lion Inn, University Park, Pa., Jan. 10-12.

Illinois Nurserymen's Assn., Annual Convention and Trade Show, Hotel LaSalle, Chicago, Jan. 15-17.

Virginia Nurserymen's Assn., Annual Convention, Williamsburg Lodge, Williamsburg, Jan. 15-17.

New York State Arborist's Assn., The Concord Hotel, Kiamesha Lake, N. Y., Jan. 15-17.

Maryland Nurserymen's Assn., Annual Meeting, Washington Country Club, Gaithersburg, Jan. 17-18.

Ohio Chapter, ISTC, Annual Meeting; Ohio Nurserymen's Assn., Winter Meeting; and Ohio State University Short Course for Arborists, Turf Managers, Landscape Contractors, and Nurserymen, Sheraton Hotel, Columbus, Jan. 23-26.

Virginia Turfgrass Council, Hotel John Marshall, Richmond, Jan. 24-25.

California Weed Conference, Hilton Inn, San Diego, Jan. 24-26.

Southern Weed Conference, Jung Hotel, New Orleans, La., Jan. 24-26.

Illinois Custom Spray Operator's Training School, University of Illinois, Urbana, Jan. 25-26.

tising, Portland, who spoke on printing and direct mail advertising for the spray service; Mrs. Marguerite Norris Davis, Portland garden writer, who offered "A Woman's View of the Professional Spray Industry"; and Robert W. Averill, public relations director of Merritt-Davis Schools, Salem, Oreg., who addressed the banquet session on "Public Relations and the Pesticide Applicator."

First N.W. Regional Meet

Termed the first truly regional event sponsored by the Pacific Northwest Spraymen's Association, which encompasses Oregon, Washington, Idaho, and British Columbia, the conference was hosted by the Pesticide Sprayers Association of Portland, Oreg., a component member of PNSA.

Officers of the northwest group for the coming year were elected at a business session. Jack Daniels, Green-Up Spray Service, Seattle, Wash., takes over as president from William Owen, General Spray Service, Clackamas, Oreg. James Overton, Miller Products Co., Portland, Oreg., becomes vice president. Donald Mock, Shamrock Spray Service, Seattle, was chosen secretary-treasurer.

In other actions, the association's board of directors appointed committees to undertake studies in two areas. One committee will look into tank life residual values of various insecticide compounds as they are mixed in solution by a custom applicator. This is being done in an effort to find out how long a given mixture is "good" after it has been prepared in the tank and, for some unexpected reason, is not used immediately.

Second committee will chart herbicide compatibilities. The Board feels this represents an area of great need in the spray industry, and one that has not been sufficiently investigated.

Next year's Spray-O-Rama is being planned for the Seattle, Washington area.

Ill. Turfmen Meet Dec. 1-2

Dr. Noel Jackson, University of Rhode Island, and Dr. R. W. Miller, Ohio State University, are among guests slated to address the Seventh Illinois Turfgrass Conference at the University of Illinois, Urbana, Dec. 1-2. Jackson will cover turf diseases and their control, and Miller discusses turf culture.

For golf course interests, J. L. Holmes, USGA Greens Section, will recommend procedures for selecting golf course sites. In addition, University of Illinois staffers will examine weed control, insects and their control, pesticide compatibilities, and recreational landscaping. Complete conference proceedings are to be available for those attending. For more information contact Dr. Fred Weinard, secretary-treasurer, Illinois Turfgrass Foundation, 100 Floriculture Building, University of Illinois, Urbana, Ill. 61801.

Safe Herbicide Use Theme of Jan. NEWCC

"Safe Use of Herbicides" will be a major program theme when weed specialists meet at the Hotel Commodore, New York City, on Jan. 4-6, for the 21st annual Northeastern Weed Control Conference.

U. S. Representative Jamie L. Whitten is scheduled to leadoff the Wednesday, Jan. 4 general session with a discussion of "The Role of Land-Grant Colleges." Other speakers on this session will include Dr. F. R. Van Abeele, executive vice president of Elanco Products Co., Indianapolis, Ind., and Dr. Ernest R. Marshall, of Union Carbide Corp.'s International Division, New York. Both speakers will emphasize use of pesticides. Basic research papers will be presented Wednesday, and a complete schedule of sectional meetings is planned for Thursday and Friday.

Directing '66 conference activities is president Richard D. Ilnicki, Department of Soil and Crops, Rutgers University, New Brunswick, N.J. John Gallagher, Amchem Products, Inc., Ambler, Pa., is vice president; and Arthur Bing, Cornell Ornamentals Research Laboratory, Farmingdale, N.Y., is NEWCC secretary-treasurer.

Additional program details will be announced here next month.

Past Presidents of the Northeastern Weed Control Conference assembled for this group photograph, taken at '66 banquet. Former chief executives are lined up (starting at front row left) in order of the year they served. Only two are missing from photo: Dr. Gilbert A. Ahlgren, first president of the group in 1947-48, who was on a special agricultural assignment with the U. S. government in Viet Nam; and John D. Van Geluwe, of Geigy Agricultural Chemicals Corp., Ardsley, N.Y. Pictured (left to right) are **(front row):** Dr. Robert D. Sweet, Cornell University, Ithaca, N.Y.; Dr. Howard L. Yowell, Esso Chemical Co., New York, N.Y.; Dr. Steve M. Raleigh, Pennsylvania State University, University Park, Pa.; Dr. Charles E. Minarik, of Ft. Detrick, Md.; and Dr. Robert H. Beatty, Amchem Products, Inc., Ambler, Pa. **Second row:** Dr. Albin O. Kuhn, president, University of Maryland, Baltimore Campus; Dr. L. L. Danielson, USDA, Plant Industry Section, Beltsville, Md.; Dr. Charles L. Hovey, Agway, Inc., Ithaca, N.Y.; Dr. Stanford N. Fertig, Amchem Products, Inc.; Dr. L. Gordon Utter, Diamond Alkali Co., Painesville, Ohio; and E. (Lish) M. Rahn, University of Delaware, Newark, Del. **Third row:** Dr. Lawrence Southwick, Dow Chemical Co., Midland, Mich.; Dr. Donald A. Schallock (deceased, April, '66), formerly at Rutgers University, New Brunswick, N.J.; Anthony J. Tafuro, American Cyanamid Co., Yardley, Pa.; Dr. Robert A. Peters, University of Connecticut, Storrs, Conn.; and Dr. Gideon D. Hill, duPont Chemical Co., Wilmington, Del.

Classifieds

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

Rates: "Position Wanted" 5c per word, minimum $2.00. All other classifications, 10c per word, minimum $2.00. All classified ads must be received by Publisher the 10th of the month preceding publication date and be accompanied by cash or money order covering full payment. **Boldface rule box:** $15.00 per column inch, two inch minimum.

HELP WANTED

EXPANDING SOD FARM in Northeastern United States, covering a tri-state area, needs farm manager. Must be familiar with seeding, fertilizing, diseases, weeds, etc., plus material purchasing and handling of men. Turf school graduate desired, but not a must. Also need foreman with similar experience. Excellent wages, paid holidays and vacations. Excellent future for qualified men. Send résumé to Box 22, Weeds Trees and Turf magazine.

FOR SALE

ONE 60-GPM HARDIE sprayer, 500-gallon tank, Wisconsin air-cooled motor; one 40-gpm Iron Age sprayer, 500-gallon tank, LeRoi Industrial motor. (These complete sprayer units go on and off flat-bodied trucks.) Also one 60-gpm Hardie pump; lawn measuring wheels; weed booms for lawn spraying; one 15-gpm complete lawn sprayer, 275 tank on wheels. Write Box 20, Weeds Trees and Turf magazine.

Jari's Heavy-Duty Rotary Mower Designed for Safety

"Jobmaster VI," a heavy-duty self-propelled, rotary mower recently introduced by the Jari Corp., Minneapolis, Minn., is designed to close the "hazard gap," the maker says. To reduce clearance between the rear of the mower housing and the ground, "the hazard gap," Jari has installed a safety flange that hangs between the operator and blade. This flange, which is mounted on wheel axles, cuts ground clearance to ½ in. and acts as a shield for the operator.

With two forward speeds, reverse, and free-wheeling, Jobmaster VI is powered by a 6-hp. engine with recoil starter, and cuts a 25-in. swath. The four-wheeled mower can safely accommodate moderate to large-size mowing areas, and is adaptable to the finest turf as well as to man-size brush or weeds, Jari declares.

Available in walk-behind or

Jobmaster VI rotary mower has reduced clearance between rear of housing and ground for safer operation, maker Jari Corp. says.

riding models, Jobmaster VI weighs 185 lbs. and is constructed of 10- to 12-gauge steel weldments. The tempered single cutter blade has a 4-in. long sharpened edge with ½-in. high turbulence surfaces and is housed in a 5-in. deep elliptical grass chamber. Now being marketed by Jari's distributors and dealers, Jobmaster VI will be described in detail for those writing Jari Corp., 2950 Pillsbury Ave. South, Minneapolis, Minn. 55408.

Cyclone Offers New Pull-Type Spreader

The Cyclone Seeder Co., Inc., Urbana, Ill., now offers a broadcast lawn spreader designed to be pulled behind riding mowers and small lawn and garden tractors. Model B-P spreader is reported to be suitable for seeding, spreading fertilizers, granular pesticides, soil conditioners, ice melters, and similar materials.

A smooth swath with tapered edges, without "hot spots," streaks, or misses is obtained from the spreader, Cyclone says. Pelleted materials are spread in swaths up to 8 ft. wide. Model B-P has a drawbar hitch that adapts to all pulling equipment and a conveniently located positive off/on control. A Cyclone Micro Dial rate gauge adjusts seed and broadcast rates. Other construction features include nylon bearings, nylon gear box, precision gears, galvanized steel hopper, stainless steel rotary agitator, and feed guides.

Readers wishing to know more about the new Cyclone lawn spreader can contact The Cyclone Seeder Co., Inc., Urbana, Ill.

Pull-type Cyclone spreader-seeder spins out material in a smooth swath up to 8 ft. wide.

Advertisers

INDEX TO ADVERTISEMENTS

Insect Report

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

Turf Insects

FALL ARMYWORM
(Spodoptera frugiperda)

Texas: Building up in eastern part of state. Moderate to heavy on lawns in Kaufman, Henderson, and Gillespie counties.

GREEN JUNE BEETLE
(Cotinis nitida)

Oklahoma: Larvae heavy and damaging turf in areas of Tulsa County.

A BILLBUG
(Sphenophorus venatus vestitus)

Kansas: Reports of lawns in Johnson County heavily damaged.

CHINCH BUGS
(Blissus spp.)

Arkansas: *B. leucopterus* widespread and heavy in St. augustinegrass in Little Rock. **Texas:** *B. insularis* damaging St. augustinegrass in Orange and Delta counties.

EUROPEAN CRANE FLY
(Tipula paludosa Meigen)

Washington: Specimen reported from Blaine. First record of this serious pest of sod grasses in U.S.

BERMUDAGRASS MITE
(Aceria neocynodonis)

Hawaii: Reported for first time. All stages heavy on bermudagrass in Lihue, Kauai, and on University of Hawaii campus in Honolulu, Oahu.

SOD WEBWORMS
(Crambus spp.)

Maryland: Ioslated heavy damage reported at Bowie, Prince Georges County. Moths heavy in New Carrollton. **Nebraska:** Heavily damaging many lawns in Lincoln, Lancaster County.

Insects of Ornamentals

BAGWORM
(Thyridopteryx ephemeraeformis)

Delaware: Widely distributed and causing more injury than in recent years. Many deciduous trees as well as evergreens infested. **Maryland:** Severe infestation, in pupal stage, on arborvitae at Kent Island.

BOXELDER BUG
(Leptocoris trivittatus)

Texas: Moderate to heavy on many ornamental plants and shade trees in southern part of Hood County.

SPITTLEBUGS

South Carolina: Severely damaging ornamentals in Richland County.

Tree Insects

SPRUCE GALL APHIDS
(Adelges spp.)

Rhode Island: *A. cooleyi* and *A. abietis* more evident than in recent years.

ELM LEAF BEETLE
(Pyrrhalta luteola)

New Mexico: Serious on elms in Albuquerque, Bernalillo County. Most common on Chinese elm. **Texas:** Reported on Chinese elms in Upton County. **Utah:** Defoliated about 25% of elms at Kanab, Kane County.

SMALLER EUROPEAN ELM BARK BEETLE
(Scolytus multistriatus)

California: Medium on Chinese elms in Escondido, San Diego County, and on evergreen elms in Riverside, Riverside County. **Michigan:** Causing twig drop in Lower Peninsula. **Nevada:** Found in Elko County elm for new record. **Oregon:** Infesting Chinese elm in Hermiston, Umatilla County; another new county record.

AN ENGRAVER BEETLE
(Ips avulsus)

North Carolina: Dominant species in worst epidemic in 10 years, affecting most of Piedmont and some adjacent mountain counties. Infestations vary from few trees to 5 acres. Young pine plantations heavily hit.

LACE BUGS
(Corythucha spp.)

Maryland: Sycamore lace bug *(C. ciliata)* severe on numerous sycamores in Prince Georges and Queen Annes counties. **Michigan:** *C. ciliata* adults and nymphs numerous in Ingham County. **Ohio:** large populations discoloring white oak in Vinton and Athens counties. **Pennsylvania:** *C. ciliata* heavy on sycamores in Wyoming County.

CATALPA SPHINX
(Ceratomia catalpae)

Ohio: Severe defoliation of catalpa trees in Franklin and Delaware counties, and widespread in several north-central counties.

OAK SKELETONIZER
(Bucculatrix ainsliella)

Delaware: Feeding on oak in New Castle County. **Maryland:** Heavy damage to white oak foliage in Harford County.

FALL WEBWORM
(Hyphantria cunea)

Colorado: Numerous in poplar, cottonwood, and other shade trees in area around Grand Junction. **Illinois:** Nests light to moderate in western section. **Indiana:** Heavy in Washington, Warrick, and Gibson counties. **Michigan:** Trees widely infested in St. Joseph and Cass counties, especially wild cherry, hickory, and walnut. Webs and larval feeding injury noted. **Mississippi:** Substantial on several shade tree species in Choctaw and Yazoo counties. **New Mexico:** Medium on shade trees in Espanola, Rio Arriba County. **Oklahoma:** Moderate to heavy in central and eastern areas. **Virginia:** Infesting shade trees in Gloucester County.

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

Trimmings

Scooped. *WTT finds itself scooped in reporting Michigan State University's new asphalt layering process for reclaiming droughty, sand soils. The villain: weekly Time magazine. Developers Clarence Hansen and Earl Erickson of MSU are receiving wide notice for their bituminous innovation. Big pitch for pitch, so to speak.*

* * *

Bus Pass for Plants. Don't be surprised if an azalea or young maple is your traveling companion next time you leave the driving to a bus line. Big bus companies have recently announced that plant materials are again welcome bus travelers, after having been banned for several years. Shippers buying passes for their plants should check state laws; some still don't allow plants to debark within their boundaries, and California continues to prohibit shipments through the state.

* * *

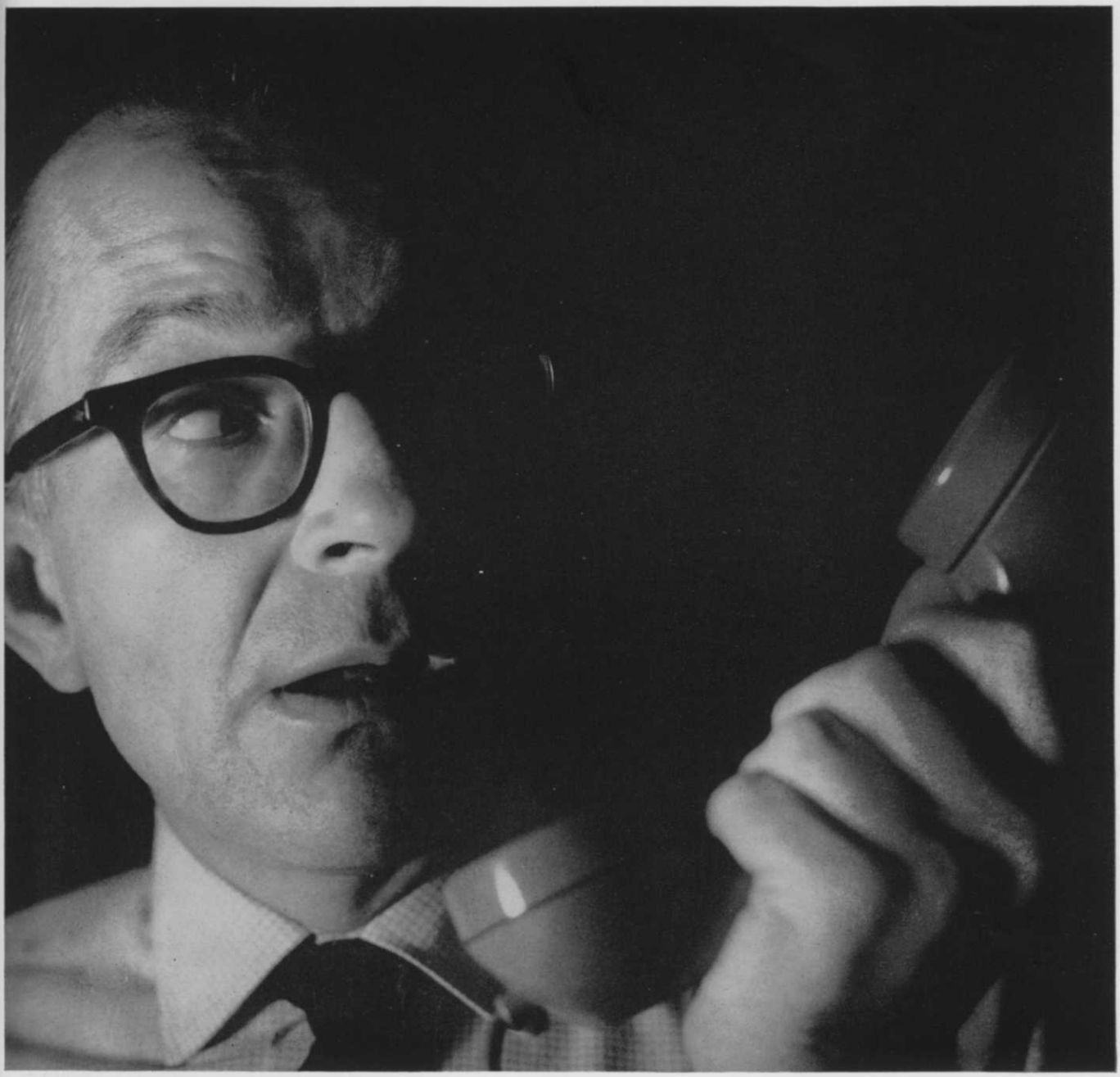
New Faces. *Two new appointments have come to our attention this week. James V. Parochetti will join the agronomy department staff at the University of Maryland. Jim is a Purdue graduate, who has completed requirements for his Ph. D. in weed control. A member of the Weed Society of America, he'll do research and extension work in weed control at Maryland. The American Association of Nurserymen has also increased its staff. Philip E. Bacon becomes an administrative assistant for the trade association. He'll have general management duties and assist with the Horticultural Research Institute. Our congratulations to both appointees.*

* * *

Read the What? No offense intended, but we think the University of Maryland extension service forgot to read something when it announced that "Larry the Label" is now available on bookmarkers. Larry is a reminder, their release says, "to always read the *driections* before using any kind of pesticide." Fortunately, the marker itself urges: "Use pesticides safely, Read the label." We're glad of that; "Larry the Driections" just doesn't have the Damon Runyonesque touch of "Larry the Label."

* * *

Birds Bomb Plans. *For two years, the '66 meeting of the International Crop Improvement Association had been planned for Baltimore. Then, as time was drawing uncomfortably close, the Baltimore birds won a baseball championship and crop scientists got the bird when the host hotel cut their allotment of rooms for the meeting. Reluctantly bidding bye to baseball town, the group switched its meeting to Rochester, N.Y., at the last moment. There, away from world series hustle, delegates discussed, among other items, Kentucky bluegrasses and the New Jersey Sod Certification Program.*



Want to hear from your customers less often? Use Geigy herbicides.

You'll hear from your customers less often in this case for only one reason. And that's because they'll be getting positive long-term weed control that Geigy industrial herbicides deliver with just a single application.

This, of course, will help you to eliminate time-consuming and unprofitable call-backs. So you'll be free to take on new customers or expand the maintenance services you offer.

Each Geigy industrial herbicide has special features to solve specific problems. As a group, they can handle just about any annual and perennial weed problem customers can toss your way.

So it will definitely pay you to find out more about these Geigy herbicides: Atrazine 80W wettable powder, Simazine 80W wettable powder, Pramitol™ 25E emulsifiable solution, Pramitol™ 5P pellets, and Atratol™ 8P pellets.

Remember, each one has its place in a fully effective weed control program. So you might need them all in order to solve most of your customers' weed problems.

Write us today to find out more about Geigy industrial herbicides.

Geigy Agricultural Chemicals, Division of Geigy Chemical Corporation, Ardsley, New York 10502.

Geigy

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Push button
electric starting

Easy pull
DSP starting

Push the button to start. That's all it takes with McCulloch's electric starting MAC 3-10E. It's the world's safest starting chain saw. You start with both hands on it. A completely self-contained starter/generator unit supplies the starting muscle, then recharges its batteries as you cut . . . no cord. Weight? Still lighter than most other saws with ordinary starting. □ And another McCulloch innovation — DSP easy pull starting — cuts starting effort in half. Two fingers' worth of pull is all it takes, even on cold mornings. DSP makes starting far safer, also makes ropes and starting mechanisms last longer. □ See them at your McCulloch dealer's soon. You've been working too hard.

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They had to be McCullochs.