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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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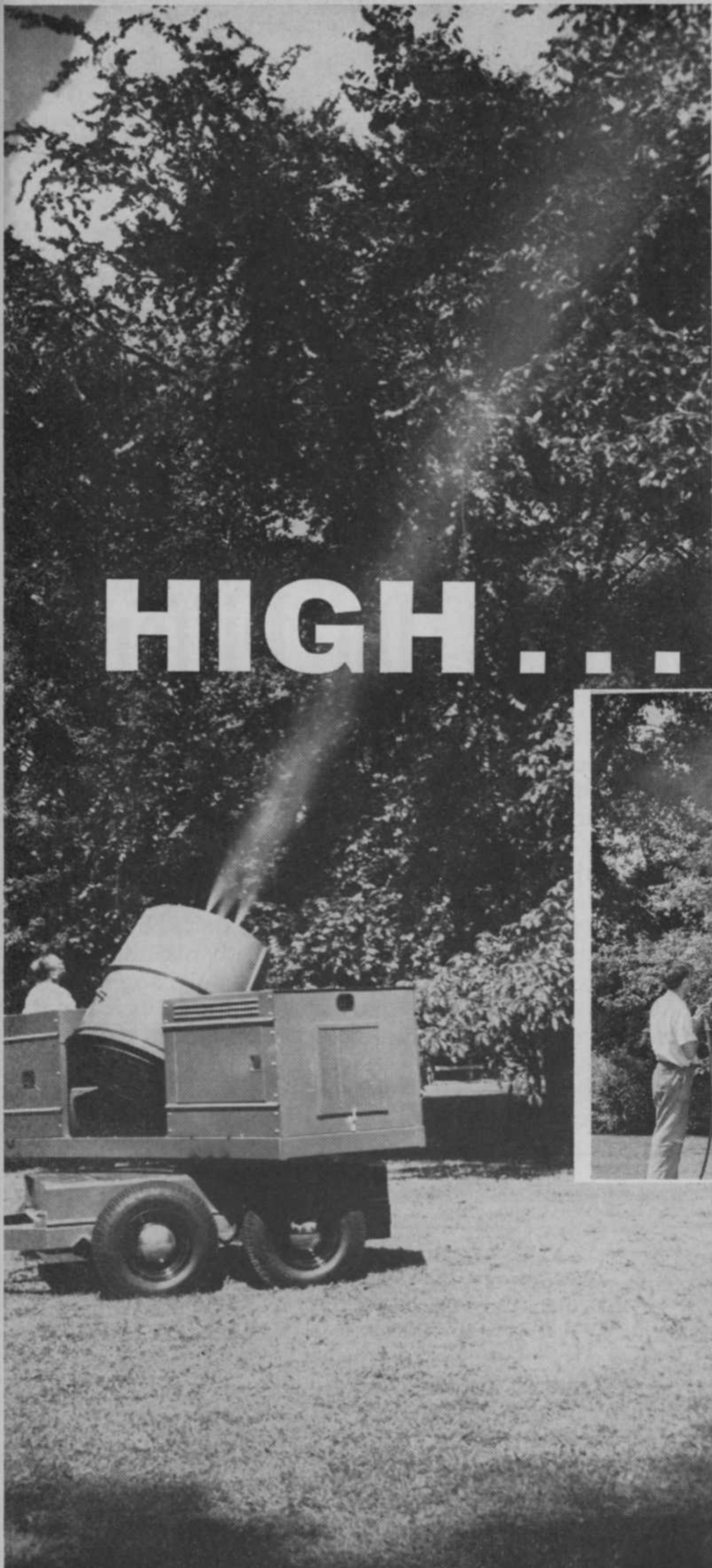

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UNION CARBIDE AGRICULTURAL PRODUCTS

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

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 postemergence 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 preemergence herbicides.

Chemical	Rates lb. ai/A	Turfgrass Injury Ratings[1] Bermuda	Emerald Zoysia	Kentucky Blue	Red Fescue	Bent Greens
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.

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)

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.

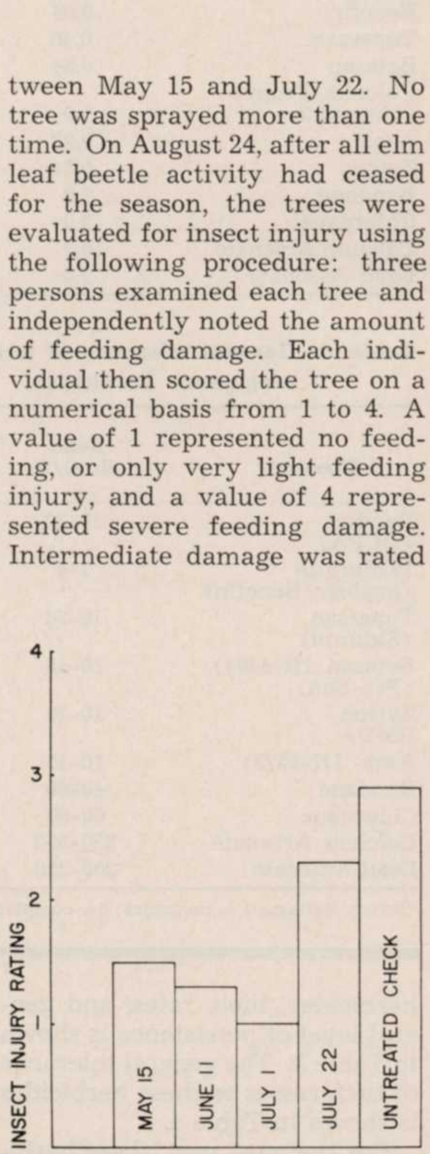

Figure 1. Injury ratings made Aug. 24 on elms treated at dates shown with 1 lb. of carbaryl per 100 gals. of water.

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 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.

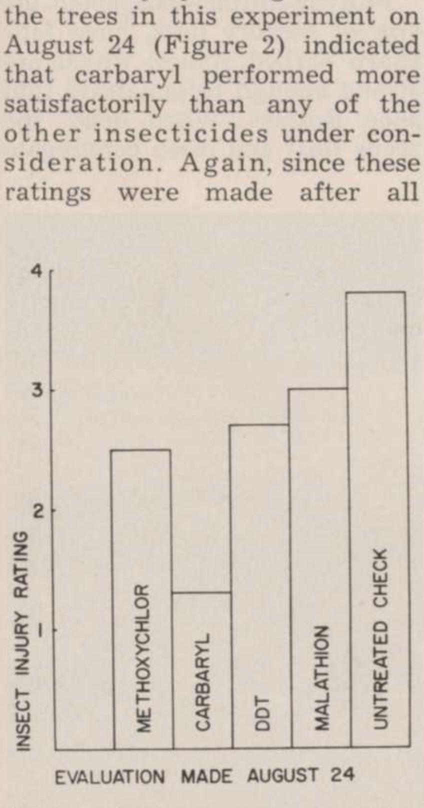

Figure 2. Injury ratings made Aug. 24 on elms treated June 11 with 4 insecticides, all at 1 lb. a.i. per 100 gals. of water.

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

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.