tem. They lack respiratory and circulatory systems.

The eyeless head portion of plant parasitic nematodes carries a specialized hollow stylet, similar to a hypodermic needle, through which nematodes inject digestive fluids into individual plant cells before they suck out the cell contents. Nematodes lacking stylets cannot injure plants and are called nonparasites.

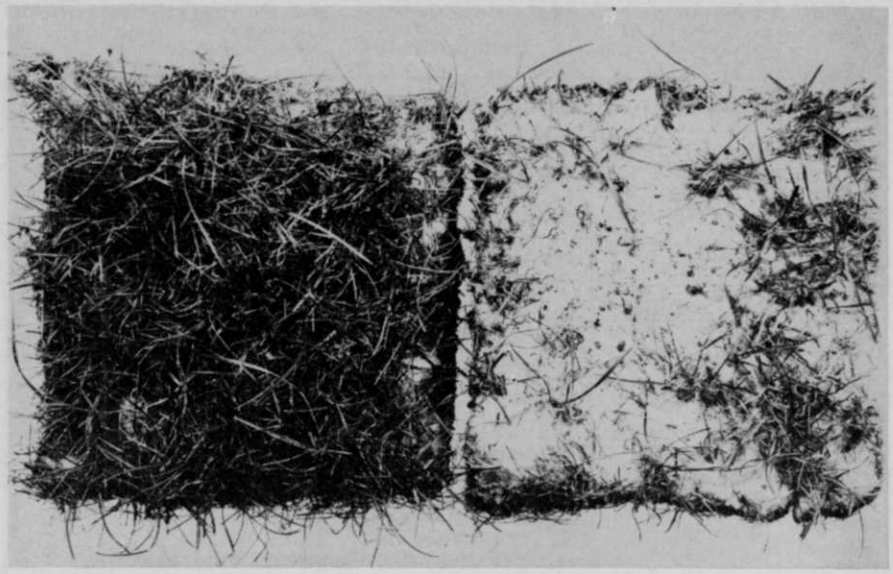
Plant nematodes can be grouped according to the plant area where they feed. There are foliar, seed, and root nematodes. Foliar and seed nematodes travel, under moist conditions, up plant stems and enter flower parts, leaf pores, or stems. Stunting, malformation, and discoloration results from nematode feeding in these areas.

Root nematodes can be divided into two types, ectoparasites and endoparasites. Ectoparasites feed on plant roots from outside the plant. Endoparasites burrow partially or totally into plant roots to feed; these may cause galls, or cysts in roots.

The name "nematode" is derived from Greek and literally means "threadlike." As a group nematodes are also called eelworms or threadworms. Other common names for individual species give the reader some idea about the function of the mouthparts, the way nematodes look in the soil, or the effect of feeding. Some ectoparasitic types are called spiral, sting, dagger, ring, lance, and stubby root nematodes. Others, which burrow to varying depths into roots and plant parts are called root-knot, burrowing, grass-seed, and meadow (lesion) nematodes. The most familiar is the root-knot because the nematode feeding causes roots to swell forming knots which are visible to the naked eye. Several experts advise use of technical names as listed in Tables 1A and 1B since common names vary and can confuse.

Determine Nematode Damage

Nematode damage to turf manifests itself in a generalized way, that is, there is no one symptom that one can chalk up to nematodes. Some authorities disagree on the importance, if any, of nematodes in turf. So far, they say, the proof has been only statistical that a plant may grow better for a while in treated soil versus untreated soil. The long-term effects of nematode predator destruction and making the soil devoid of both destructive and beneficial organisms have not been established, dissenters claim.



Kentucky bluegrass showing response to nematode control by V-C 13. Left treated with 20 gallons per acre; right untreated (after Perry, Darling, and Thorne, 1959).

Control proponents believe that nematodes do have a direct effect on plant vitality, though individual nematodes are much too small to test separately. They also believe that nematode feeding wounds plants and thereby predisposes them to infection by pathogenic soil bacteria, viruses, and fungi. Some nematodes are proven vectors of pathogens. By keeping plants free of wounds, they feel, a healthier "crop" results.

With this disagreement in mind, we can tally what is known so far about the effects nematodes "have been shown" to have on plants.

Symptoms generally include loss of plant vigor, chlorosis (loss of green color), and discoloration in some cases. Roots may be discolored or deformed. Many plants which are drought stressed by lack of moisture show results of nematode feeding. Affected plants show symptoms of nutrient deficiency; sometimes the ailment is indeed a nutrient lack, and sometimes nematode damage simulates this condition. Nematode feeding stunts and deforms new root growth so that nutrients are not absorbed efficiently.

Stems of parasitized grasses may show an obvious shortening between joints. Roots may begin to rot in advanced stages of decline, and sometimes may be covered with lesions or galls as a result of nematode feeding. Some nematode species even affect grass seedheads by feeding in flower parts causing galls to form instead of seed.

Nematode damage can be mistaken for turf ills such as fungus attack, lack of watering, soil compaction, and insect depredation. All these cause similar symptoms. The only way parasitic nematode presence may be determined with accuracy is for an experienced nematologist to analyze a well-prepared soil sample.

Contract applicators can use the process of elimination when diagnosing a suspected case of nematode damage. Many turf ills, such as those mentioned above, can be determined by simple tests and visual inspection. Eliminate the possibility of nutrient deficiency by a soil test for chemical elements. Examine soil to be certain it is not compacted. Culture a tuft of weakened turf with damp filter paper to see if there is any fungus dis-

Table 1A. Nematode Genera, Host Grasses, and Damage Observations
Endoparasites

Nematodes	Some Grasses Affected	Damage Remarks
Cyst Nematodes *Heteroda* spp.	creeping bentgrass Italian ryegrass perennial ryegrass red fescue rough bluegrass St. Augustinegrass	Females encyst in fibrous roots; cysts are visible and tan colored. Established stand contol not now possible.
Root-knot Nematodes *Meloidogyne* spp.	Bermudagrass dallisgrass Kentucky bluegrass St. Augustinegrass	Swellings on both fibrous and lateral roots. Swellings colored same as normal roo' tissue.
Root-lesion Nematodes *Pratylenchus* spp.	bentgrass Bermudagrass centipedegrass crested wheatgrass Kentucky bluegrass St. Augustinegrass tall fescue zoysia	Minute brown lesions visible. These lesions may enlarge and girdle root; this causes pruning. There is little new growth evident.
Burrowing Nematode *Radopholus* sp.	bahiagrass Bermudagrass carpetgrass large crabgrass St. Augustinegrass	Damage similar to root lesion nematode. Root spots become necrotic. Cavities form; girdling and root rot result.
Grass-seed Nematode *Anguina* sp.	bentgrass colonial bentgrass creeping bentgrass redtop velvet bentgrass	Galls are produced in grass flowers. Nematodes inside make purplish galls instead of grass seed.
Leaf-gall Nematodes *Anguina* sp. *Ditylenchus* sp.	colonial bentgrass fescue	Diseased leaves are short, but plants do not lack vigor. Single galls found at leaf bases. These are colored first greenish, then purple, then reddish purple, finally purplish black.

ease present. Search for beetle grubs under the sod. Discuss the history of maintenance with the client since damage can result from improper care. If any of these other troubles are present, they can be corrected before damage is blamed on nematodes. If no other problem is encountered, nematodes are then strong suspects.

Sample Soil to Confirm Diagnosis

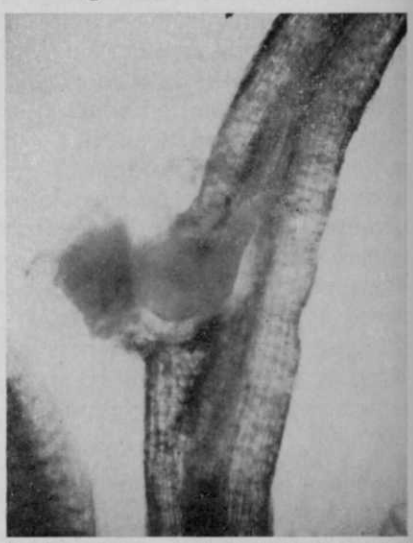
When all factors except nematodes have been considered and eliminated, take a soil sample and send it for analysis to a state extension service or experiment station nematologist with whom a cooperative understanding has been previously arranged.

Soil samples are not difficult to take, but care is needed to get an accurate sampling of overall conditions. With a small trowel take soil from the top six inches under the sod around the border of the affected area. Some diseased plant material may be collected also. Sample the soil in several places and mix the collected samples well. Then remove about a pint and place it into a plastic bag and seal tightly with a rubber band. A pint jar will also work. Avoid drying of the sample. Wrap the sample securely so that postal handling will not damage it. Be certain to label well, and include name, address and what information is desired about the sample. On the label state where the sample was taken, in case anyone wants to find the exact spot again. One can never tell when he will "dig up" an undiscovered species. This information would be very important to a nematologist.

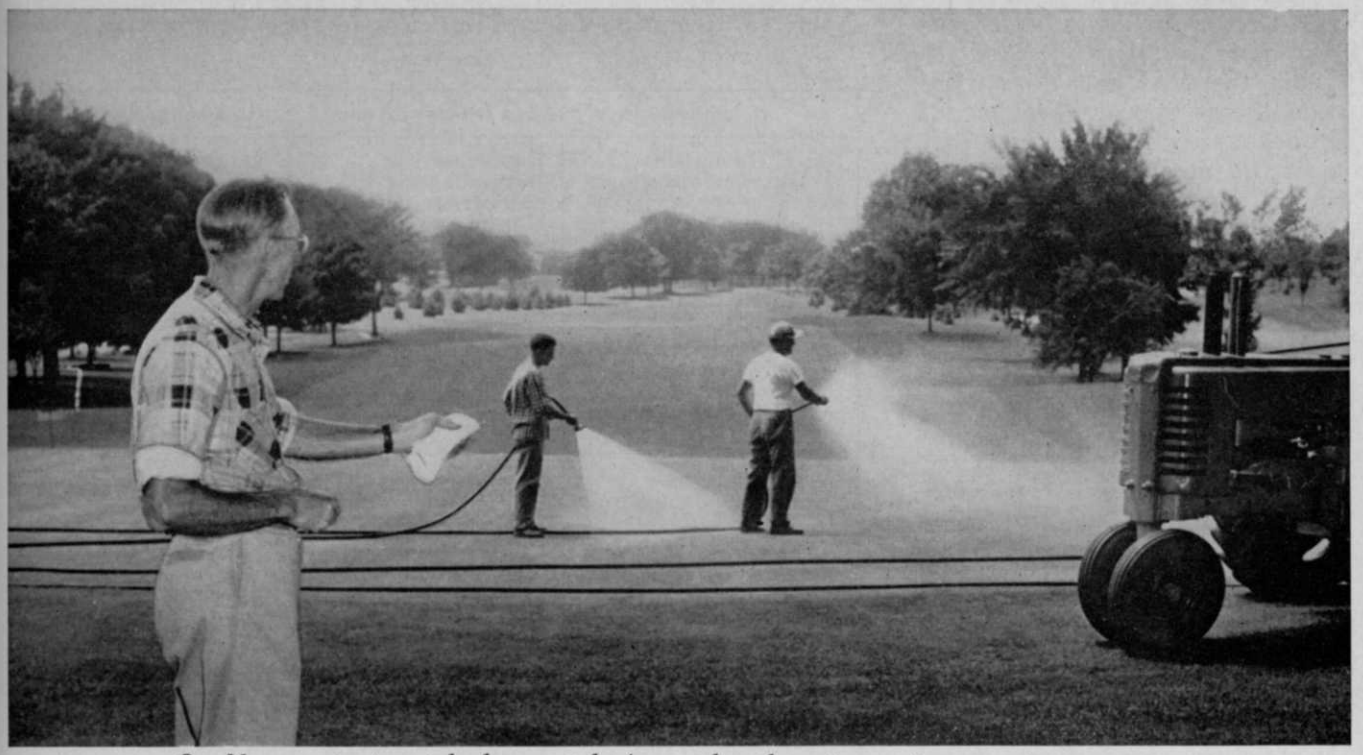
Some CAs who already have their own microscopes may believe they can identify nematodes without sending them away. It is true that one can pick out a soil-inhabiting nematode from other soil organisms with only a little practice, but most soil nematodes are not plant parasitic. There may be an abundance of these wiggling organisms, but if no known pests are among them, one will have to look elsewhere for the cause of damage. An experienced nematologist can pick out the relatively few parasitic genera quickly and accurately.

In one instance, identification of root-knot nematodes, however, the microscope may be helpful and eliminate the need to send samples away for identification. With practice one may be able to observe the galled or knotted roots. Galls may be broken open (this is a delicate task) and examined with a low-power scope to find pear-shaped females. These are hardly visible to the naked eye and look much like small pearls. Galls on most grasses are very small and usually not readily discernible. Experts caution against confusion of any galls with the nitrogen nodules of legume plants such as clovers. These are caused by beneficial bacteria.

If the pearly female nematodes are found along with brownish egg masses which cling to the sides of roots, one can decide in relative safety that the plants are infected with parasitic nematodes, either root-knot, of the genus *Meloidogyne* or cyst, of the genus *Heterodera*. This is



Root-knot nematode imbedded in plant root is shown in this photomicrograph of a nematode gall. (Photo courtesy Shell Chemical Company.)



One Nemagon treatment checks nematodes for months—the entire growing season in many areas.

How to restore nematode infested turf with remarkable new Nemagon® Soil Fumigant

UNHEALTHY turf isn't always a sign of improper fertilization or lack of water. Patchy, "worn-out" greens and tees may be caused by nematodes—microscopic soil pests that feed on and thus shorten or destroy grass roots. Their feeding impairs the plants' ability to take up moisture and minerals from the soil. Weakened plants are susceptible to disease.

Nemagon kills nematodes—not turf

One Nemagon treatment checks nematodes for months—the entire growing season in many areas. And, unlike other soil fumigants, Nemagon does not kill the turf when applied as recommended. On the contrary, now you can *save* turf you once would have destroyed—bring it back to top condition in a few weeks time with a minimum expenditure in time and labor.

Nemagon is easy to apply

You can apply Nemagon with standard spray equipment. Just add Nemagon to a sufficient amount of water to thoroughly drench the area to be treated. The recommended dosage rate is 3 tablespoons of Nemagon Soil Fumigant per 1000 square feet or 5 gallons per acre. In the soil, Nemagon becomes a potent gas that moves laterally and downward, killing nematodes as it spreads.

For more information see your local pesticide dealer, or write: Shell Chemical Company, Agricultural Chemicals Division, 110 West 51 St., New York 20, N.Y.

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Nemagon®

Soil Fumigant

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sufficient evidence to begin control measures.

For the most part, identification to the species level is not necessary. If one knows that parasitic nematodes are attacking a client's lawn, there is a nematocide or a soil fumigant which will reduce the numbers to a level below that which will be damaging to plants.

In tropical climates nematode damage may be seen all year, but in temperate regions damage is noted mostly from May to November. Nematodes do not usually provoke evident aboveground symptoms while grass is actively growing in spring and late fall. Of course soil temperatures must be about 65 degrees before nematodes hatch and begin feeding, but grass may not show symptoms until placed under stress of summer heat, lack of moisture, or additional wear. Then the absence of a good root system shows because the weakened turf begins to wilt and thin and becomes susceptible to pathological and physiological disorders caused by fungi and bacteria. Tables 1A and 1B show grasses affected by various types of nematodes and general remarks about specific damage observations.

Table 1B. Nematode Genera, Host Grasses, and Damage Observations

Ectoparasites

Nematodes	Some Grasses Affected	Damage Remarks
Spiral Nematodes *Helicotylenchus* spp.	Bentgrass Bermudagrass dallisgrass Kentucky bluegrass ryegrass St. Augustinegrass zoysia	Grass grows well until midsummer when shallow roots prevent absorption of deep water. Nematodes in soil attack most severely in spring; plants revive in late fall.
Sting Nematodes *Belonolaimus* spp.	Bermudagrass centipedegrass Italian ryegrass St. Augustinegrass zoysia	Root lesions restricted to tips where nematodes feed. Malformation of roots evident.
Stylet Nematodes *Tylenchorhynchus* spp.	annual bluegrass bentgrass Bermudagrass centipedegrass crabgrass grama grass Kentucky bluegrass ryegrass zoysia	No lesions evident on roots. Roots shriveled, shortened, and sparsely developed.
Ring Nematodes *Hemicycliophora* spp. *Criconemoides* spp.	Bermudagrass centipedegrass Kentucky bluegrass St. Augustinegrass zoysia	Lesions present at root tips and sides. Root rotting extensive.
Pin Nematodes *Paratylenchus* spp.	grama grass Kentucky bluegrass meadow fescue red fescue ryegrass	Noticeably stunted plant; shortened internodes. Root system larger, but lateral growth lacking proportionately.
Stubby root Nematodes *Trichodorus* spp.	Bermudagrass centipedegrass meadow fescue perennial ryegrass red fescue St. Augustinegrass	Short lateral root branches. Color darker than normal. No distinct lesions or galls.
Dagger Nematode *Xiphinema* sp.	bentgrass Bermudagrass carpetgrass dallisgrass grama grass rough bluegrass St. Augustinegrass zoysia	Chlorotic, sunken, reddish-brown lesions seen on roots. Roots stunted and rotting.
Lance Nematode *Hoplolaimus* sp.	annual bluegrass bentgrass carpetgrass dallisgrass Kentucky bluegrass St. Augustinegrass zoysia	Swelling on roots at feeding zones. Roots turn dark brown. Cortex falls away.

Pre-plant Controls

Two types of control are open to CAs for use against nematodes: pre-plant and post-plant. Pre-plant control involves cultivation, seedbed preparation, and use of one of several fumigant materials. Certain fumigants when properly applied destroy fungi, weeds, grass, and weed and grass seeds, in addition to nematodes. These are useful when one intends to reseed or resod.

Some of the more familiar of these all-purpose soil fumigants are methyl bromide, chloropicrin, Mylone, Vapam, and Vorlex. Labels of some of these fumigants state that tarping is optional, but most experts advise that better results will be obtained with all fumigants if tarps are used. Results are not as dependable, when a water seal is used to contain a drenched fumigant, as the results when a cover is used.

Depending upon the chemical, some labels state that seedbed or sodbed preparation may not be essential, but again experts suggest that good results are more predictable if an area to be fumigated is cultivated and raked before any chemical is applied. There have been cases where undisturbed dead grass serves as a good holding mechanism for new seed, but long-range results are unpredictable at this time.

Mylone, Vapam, chloropicrin, Vidden D, D-D, Telone, ethylene dibromide, dibromochloropropane, and Vorlex may be applied as a drench or rototilled into soil. This application followed by enough water to make an effective seal may do the job.

Methyl bromide is highly toxic and will always require a tarp

(Continued on page 26)

KEEP GRASS GREEN WITH

V-C 13®

KILLS NEMATODES AND CHINCH BUGS

V-C 13 is the ideal liquid product to use to protect turf from nematodes and chinch bugs. Nematodes are tiny, thread-like worms that attack grass roots and stunt or ruin growth. Fertilizer, water and good care are wasted when nematodes wreck grass roots. Chinch bugs are death on green grass. They actually suck the life out of grass stems. The grass turns yellow and then brown, as it dies. V-C 13 is a practical, easy way to destroy nematodes and chinch bugs. It provides powerful, long-lasting control of these destructive pests. And V-C 13 is safer to use, lower in toxicity than chlorinated hydrocarbon preparations. It's easy to keep grass green with V-C 13. Get it from your supplier or write to the address below for full information.

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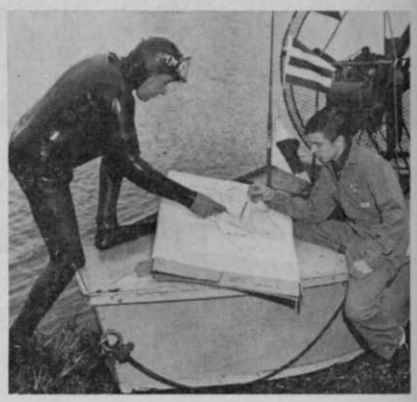

Submerging diver, left, rides diving plane toward lake bottom for look at weed infestation. Pilot George Harris (in airboat) is able to maneuver while towing the diver because the towline is attached to a special hitch in keel of boat under operator's chair. Above, diver Henry Carsner explains what he found to son Jim who is mapping the infestation.

How We Use Scuba Divers In Aquatic Weed Control

BY HENRY CARSNER and RALPH GRENFELL

Northwest Weed Service, Tacoma, Washington

Identification of weed species is prerequisite to the accurate selective control of weeds. This fact is no less true in aquatic weed control.

The problem of making a visual identification of weeds when they are under water is solved with scuba (self-contained underwater breathing apparatus) equipment.

The Northwest Weed Service of Tacoma, Washington, uses such equipment to facilitate before- and after-treatment surveys of weed beds in infested waters.

With a survey map marked out in squares, an experienced diver in a skin-tight suit, foot flippers, face mask, scuba unit, and wrist compass can examine the bottom of a lake to determine the extent of the infestation, and the species and density of the weeds. Colored pencils plot coded information on the survey map to help applicators when they put down the chemical. Marker buoys laid by the diver assist boat drivers to get on the right course.

Aquatic weeds usually grow in individual beds of single species and only in certain marginal zones in a lake. These beds can be accurately determined on the spot using underwater equipment. Beyond marginal zones, any chemical applied to deep, cold water would be of no use. Chemicals applied to known resistant species is likewise valueless.

Some lakes are fed by cold springs. We have found it to be to our advantage to find these pitfalls before chemicals are applied and wasted, swept to the weedless depths by cold currents. Knowledge of hidden facts about underwater conditions helps us bid for contracts with greater accuracy, because we know, for example, where we do not need to apply chemicals to do a complete job, and still make a reasonable profit.

Northwest also uses a diving plane: a flattened, heavy, wing-like, waterproofed, plywood board, which is towed behind our air-drive propeller-driven craft, for faster underwater searches. The plane is efficient for post-treatment examinations where checks are made to see that the job has been complete.

Sometimes weeds which are resistant to the chemical which has been applied will crop up from beds of dead plants. Prompt discovery and identification of such resistant species make later control plans easier.

Northwest Weed Service has found the diving units have paid for themselves many times over, by keeping the applicators informed and prepared.

Typical of modern, custom-designed equipment used by aquatic weed control companies is this barge belonging to Modern Weed Control Service of Grand Rapids, Mich. Owner Vic Scholl is pleased with the Douglas Fir plywood device which is 8 feet long and 2 feet wide.

Double-Duty Herbicide: New ORTHO® Diquat

Kills aquatic weeds like nothing you've ever seen and Diquat is also a terrific non-selective control for weeds around buildings, along fences, ditch banks and roadways.

Quick, and easy to use . . .

Diquat is completely water soluble so that a bare minimum of agitation is all that's required. Because there is no oil residue left behind, cleaning of equipment is greatly reduced. Diquat is absorbed by weeds like a sponge. In a matter of hours weeds collapse and die. (The label directions will tell you how much and when to use.)

Many advantages used as directed . . .

It doesn't build up in water. It is inactivated immediately on contact with soil. Diquat being water soluble eliminates constant citizen complaint of offensive weed oil odors. Diquat is non flammable and non explosive, so it materially reduces fire hazard along highway right-of-ways. Be sure to follow the label directions.

Surprisingly economical . . .

With all these advantages, Diquat is economical, too. That's because it's highly concentrated. A little goes a long way. In fact, five gallons of Diquat will control up to 20 acres of weeds. By comparison it would take up to 2000 gallons of weed oil.

"Helping the World Grow Better"

CALIFORNIA CHEMICAL COMPANY, ORTHO DIVISION, 200 Bush St., San Francisco 20, California

ON ALL CHEMICALS, READ CAUTIONS AND DIRECTIONS BEFORE USE.

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"The Public Must Be Told" Weedmen Decide At 18th Northeastern Weed Control Conference

In his opening address to more than 750 delegates at the 18th annual Northeastern Weed Control Conference, outgoing president A. J. Tafuro insisted that the entire scope of public relations must be improved and increased in the coming months if the public is to have the real truth about chemical weed control.

Tafuro, who is with American Cynamid in Princeton, N.J., made his opinions about the "PR" function quite plain: "I will suggest to the new executive committee that we put more emphasis on public relations in 1964," the industry authority indicated.

Weed control scientists like the 750-plus representatives of universities, manufacturing firms, and commercial applicators who gathered at the Hotel Astor in New York City Jan. 8-10, should contribute articles to popular and semi-technical magazines, appear on club programs, and otherwise take the true story of weed control with chemicals to the populace at large, Tafuro urged.

Tafuro's remarks preceded a trio of "keynote" addresses which touched on three salient areas of interest to the weed controllers: one renowned highway expert told how and why his state uses chemicals to control weeds; a researcher delivered a highly technical and intriguing report on the use and value of surfactants, and the third offered a compendium of 1963 tests results with promising new compounds.

Roadsides were maintained for many years without herbicides. Why then is it necessary to use herbicides in today's roadside maintenance program? asked Andrew M. Ditton in the conference's initial session.

Ditton is Senior Landscape Architect, New York State Department of Public Works, Albany.

Reason for the ever-increasing need for more efficient control of weeds along rights-of-way is the tremendous highway building boom which had its inception just after World War II.

Of course, the nature of modern highways, including turnpikes and the vast interstate system, dictates that more weed and turf work is needed, simply because of the physical nature of roadways today. Miles of median strips which thread their way across the land mean millions of dollars must be spent to keep them green, neat, and noninterfering with the essential character of the highway system.

The staggering costs of highway mowing is such that supervisors such as Ditton must resort more and more to chemical means for maintaining trimmed grass areas and landscaped embankments.

What will the industry need in the years ahead? Ditton mused. There are three developments which the landscape expert would like to see realized for tomorrow's rights-of-way programs:

1. Herbicides for broadleaf weed control which are nonvolatile and in a form (dry or liquid) that is not subject to drift;

2. Application equipment that will efficiently apply a variety of materials such as granular products as well as liquids; and

3. A growth retardant with a wider range of effectiveness, both as regards plant species and stage of growth.

"Increased emphasis must be placed on the appearance of highway roadsides," Ditton concluded. "We must recognize that the natural beauty of our roadsides is something to be cherished and protected."

Surfactants a Major Aid

"Evolution of plant species has resulted in elaborate variation of the cuticle which in part permits plants to grow in the frigid Arctic and in the blistering desert," according to C. G. McWhorter of the U. S. Department of Agriculture in Stoneville, Miss.

McWhorter co-authored (with Stoneville USDA-man E. E. Schwizer) a paper on the use of surfactants which revealed, in general, that the toxicity of many herbicides is dramatically increased when a surfactant is added to a formulation.

Much of the research at Stoneville has concerned itself with 3,4-dichloropropionanilide (DPA) 2-2-dichloropropionic acid (dalapon), and 3-(3, 4-dichlorophenyl)-1,1-dimethylurea (diuron), the plant physiologist said. In tests with diuron, the addition of surfactants increased herbicidal toxicity and activity with noteworthy results.

"Diuron-surfactant spray mixtures are obviously very phytotoxic when applied postemergence, and these treatments should be economical for weed

Keynoters at the 18th Northeastern Weed Control Conference, the largest in history, included landscape architect A. M. Ditton (below left); Maryland researcher Dr. J. D. Riggelman (below center); and USDA surfactant expert Dr. G. C. McWhorter (below right).

control in many situations," the scientist surmised.

An illustrated address which summarized the results of new herbicide tests was presented by Dr. James D. Riggelman, a research assistant with the University of Maryland Vegetable Research Center in Salisbury. There are some exciting new offerings just over the horizon. They include:

- Dicamba, or Banvel-D, a herbicide from Velsicol Chemical Corp. is said to be excellent for brush control. Dicamba is 2-methoxy-3, 6-dichlorobenzoic acid.
- SD7961 is an experimental compound from Shell Chemical. Tests indicate the product is useful for weed control in Bermuda turf. Chemically SD 7961 is 2,6-dichlorothiobenzamide.
- From Thompson-Hayward comes Casoron, 2,6-dichlorobenzonitrile (dichlobenil), a new chemicals found to be useful on ornamentals.
- Dacthal, introduced some time ago by Diamond Alkali. is finding more and more uses, and will now be available in a new formulation which will release the herbicide at a specified rate. Dacthal, dimethyl-2,3,5,6-tetrachloroterephthalate (DCPA) is in wide use as a pre-emergence crabgrass killer.
- One of the most exciting of the new chemicals is Tordon. from The Dow Chemical Co. of Midland, Mich. Tordon has been proved particularly effective for brush control, and is recommended to control cactus in turf and sassafras in cemetaries. Chemically 4-amino-3,5,6-trichloropicolinic acid. Tordon represents a new family of herbicidal compounds.
- Another product of Diamond Alkali is a brush killer made from a new salt of 2,4-D. Known as oleoyl 1. 3-propylene diamine salt, the chemical is said to possess low volatility and high penetrability with the result that many resistant species of brush are more easily killed.
- Azar is a new crabgrass killer from Hercules Powder Company, a chemical from the methylcarbamate group. Azar will soon be available on the open market.

Outgoing prexy A. J. Tafuro was justifiably proud of the current session as he congratulated new NWCC leader, Dr. Robert A. Peters.

An interesting supplement to Riggleman's presentation was the "New Herbicides from Industry" session, now a standard part of the NWCC program. In this portion representatives from various companies are permitted to stand up and tell about new chemicals which the various firms have available.

Of interest to industrial weed controllers is a new water soluble formulation of bromacil, introduced by E. I. duPont de Nemours & Co. in 1961 as "Hyvar." Once this new product is completely dissolved in the spray tank through mechanical or hydraulic agitation, no further agitation of the spray liquid is needed duPont claims.

Representatives of Hooker Chemical Corp. told of Tritac 10G, a formulation of the herbicide Tritac which was introduced last year and which is produced jointly by Hooker and U.S. Borax. The compound is said to control a wide range of annual and perennial broadleaf weeds.

Stauffer Chemical Co. now has Betasan, a selective herbicide for use on turf. Betasan can be applied as a pre-plant, pre-emergence, or postemergnce treatment on Dichondra lawns.

Allied Chemical also has a new product, the experimental herbicide coded as GC-7887, which is in fact hexaflouroacetone trihydrate. It is an effective, nonselective, systemic weed and brush killer, the Allied representative pointed out.

The record turnout of weed control personnel was justified by a program that was startling in its diversity and sheer bulk. Nearly every type of weed control problem received meticulous attention, including such divergent fields as public health weed control, aquatics, weed control in turf, and of course, as always, a most extensive analysis of rights-of-way weed and brush control problems. The scope of the program is too broad to be summarized on these pages, but a complete Proceedings has been publishd and is available, for $3.50, from the group secretary-treasurer, Dr. John A. Meade, Dept. of Agronomy, University of Maryland, College Park.

There were several outstanding presentations of particular significance for the urban/industrial vegetation management personnel who read *Weeds and Turf.*

Use Back-Pack Mistblowers

One such paper was an analysis of the use and effectiveness of the back-pack mist blower for chemical brush control on rights-of-way. The study was conducted by L. C. Kenerson and A. W. Coombs of the Dept. of Forestry, University of Massachusetts, Amherst.

In short, the researchers say the high mobility of the back-pack mistblower, the small amount of spray required to cover large areas, combined with the opportunity to vary the volume applied to suit the kind of brush, make this type of operation very versatile for use on power lines. Use of these devices should be increased in the future, the forestors urged.

Helicopter Use Increasing

Another talk which held delegates' attention was a paper on the use of helicopters for applying herbicides, presented by Charles P. Logg, Jr., vice president of New Jersey Helicopter Airways, Inc.

"The day is coming when aerial applications by the helicopter will overtake its obsolete cousin, the airplane," Logg predicted.

Conference members took time out from their busy educational program to conduct business meetings, attend a banquet, and elect a new president. He is Dr. R. A. Peters of the University of Connecticut. Dr. Meade remains as secretary-treasurer.