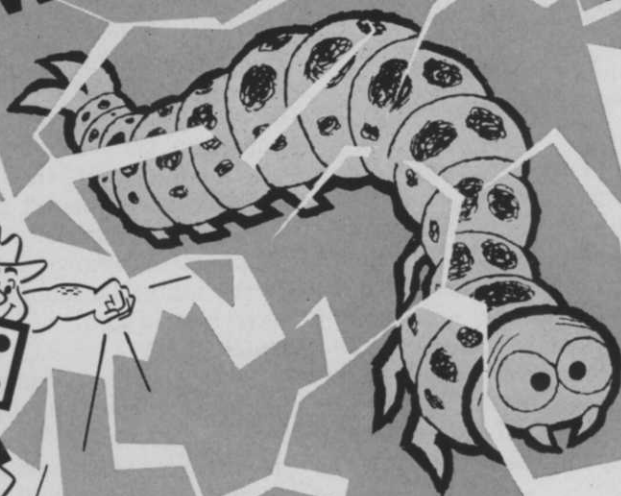


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W-11

Panogen Turf Fungicide:

Morton's New Chemical for Lawn Spraymen

By **DR. MARGARETA LAMBERT**

Supervisor of Technical Service
Research Department, Morton Chemical Company, Woodstock, Illinois

MOST contract applicators have customers who, at one time or another, have worried over brown or thin spots in turf areas where grass is wilting or dying.

Chances are this is a result of turf diseases. If so, one cure is near at hand, because treatment with Panogen Turf Fungicide will control the spread of already established diseases. Preventive treatment in a regularly scheduled spraying program will keep the turf healthy and vigorous.

Panogen Turf Fungicide is a red liquid which mixes completely with water to form a clear solution. It affords ease of application, is effective for control of common turf diseases, and is economical to use.

Active Ingredient

This new fungicide contains methylmercury dicyandiamide. This organic mercury compound has proven itself in the past as an effective broad spectrum fungicide which controls most of the fungi causing foliage diseases or seedling diseases, such as damping-off. Methylmercury dicyandiamide is an ingredient in Panogen seed treatment fungicide, which is commonly used for treatment of seeds such as small grain, cotton, beans, and peas to help control seed rot, smut, seedling blight, and other diseases.

It is also an ingredient in Morton Soil Drench, a product sold to treat soil for control of various soil-inhabiting fungi. It has been used successfully as a spray on numerous types of flowers and ornamentals.

In addition to being an excellent fungicide, methylmercury dicyandiamide is safe when applied to growing plants. At the low concentrations needed for fungus control, there is no danger of injury to these plants. Methylmercury dicyandiamide is a broad spectrum fungicide which has proven effective for control of most common disease-causing fungi. This is par-

ticularly important in the case of turf diseases, where diagnosis of the actual causative fungus may be difficult. Panogen Turf Fungicide is effective against all of the common turf diseases.

Formulation

PTF is a liquid, generally sold in glass bottles, but also available in 5-gallon cans. The liquid is completely clear, but contains a red dye for identification purposes. Freezing point of the liquid is -16° F, and consequently the compound can be stored at low temperatures without danger of crystallization. Should the liquid freeze it will readily thaw out when brought to higher temperatures. No decomposition takes place at freezing temperatures.

Color

Panogen Turf Fungicide contains a powerful red dye, and when diluted with water, the mixture maintains a faint pink color which readily identifies it. There is not enough red dye in this mixture to cause any problems with discoloration of objects which may accidentally be sprayed. People walking on newly treated turf will not pick up any of the red color on their shoes.

Compatibility

In many cases, it might be desirable to apply this fungicide in conjunction with other materials needed for treatment of the turf. It may, for example, be desirable to make fertilizer applications to turf areas. Testing has shown that PTF is compatible with common constituents of liquid fertilizers, such as potassium salts, phosphates, urea, ammonium salts, nitrates. Panogen Turf Fungicide can consequently be mixed with these materials at the time of application.

Sometimes it may be desirable to apply an insecticide for control of chinch bugs, crickets, mosquitoes, chiggers, etc. Tests have shown this chemical is stable in tank mixtures with several dif-



Dr. Lambert

ferent insecticides, such as DDT, aldrin, dieldrin, heptachlor, Tri-thion.

Iron chlorosis is sometimes a problem on turf. If it is desirable to apply iron salts for control of iron deficiency, these materials can be mixed with PTF in the tank.

When mixing this fungicide with materials such as liquid fertilizers or insecticides, it is advisable to make up the tank mixture just prior to use. It should not be stored for any period of time before use. It must be remembered that not all known formulations of the materials mentioned above have been tested.

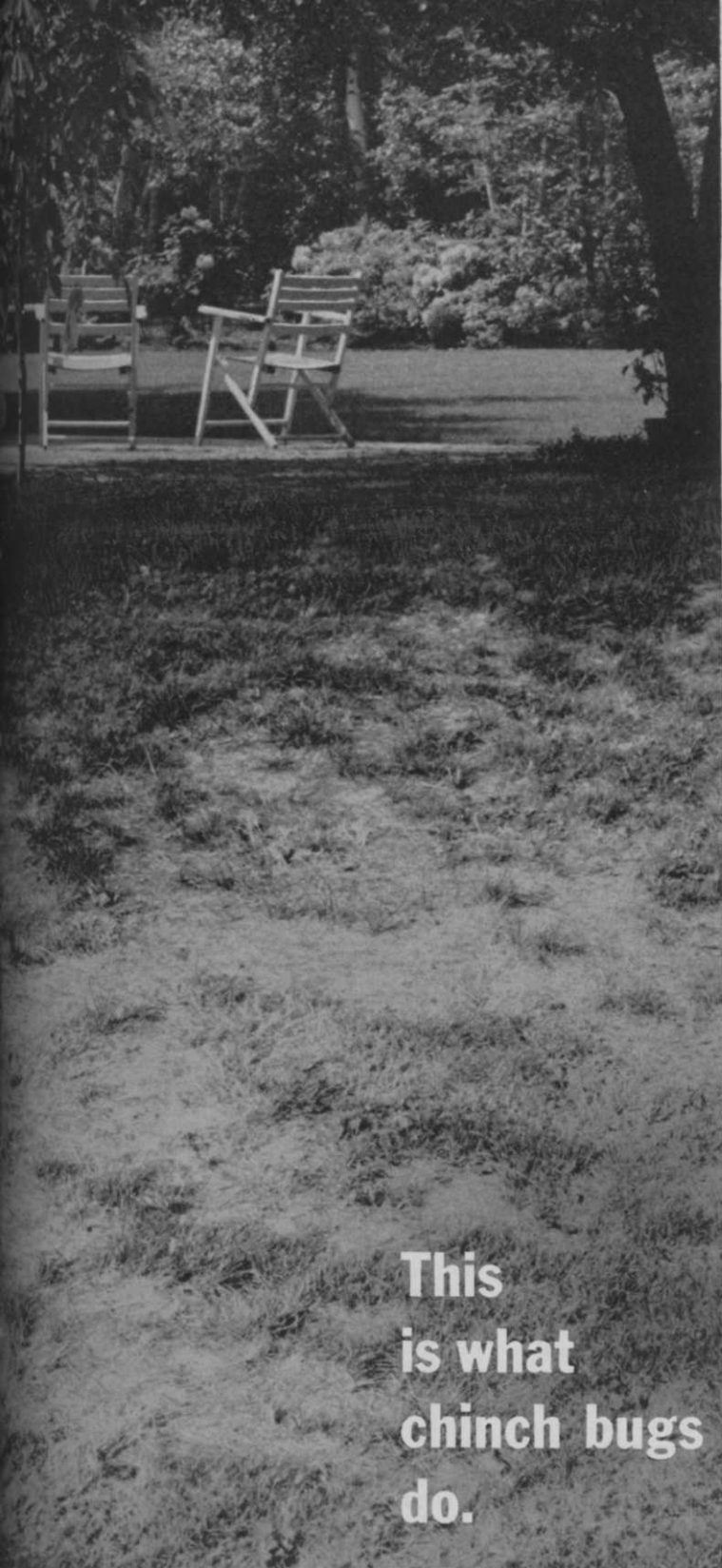
Stability

Panogen Turf Fungicide does not deteriorate during storage. Even after many years it will maintain its clear appearance and no decomposition will take place either at high or low temperatures.

Results of Tests

This product has been thoroughly tested by agricultural colleges, universities, golf courses, parks, and homeowners. These tests range from carefully planned experiments, replicated many times, to demonstration-type tests. All kinds of grasses, such as blue-grasses, bentgrasses, fescues, ryegrasses, St. Augustine grass, and other ground covers such as dichondra have been treated with Panogen Turf Fungicide successfully. Diseases such as melting out, fading out, dollar spot, copper spot, brown patch, and snow mold are all controlled by the proper application of this fungicide.

In order for PTF to effectively
(Continued on page W-17)



**This
is what
chinch bugs
do.**



**See
what
TRITHION®
does!**

Customer satisfaction—permanent patronage—requires sure, consistent results: the kind you can guarantee when you use TRITHION insecticide for lawn chinch bug control.

Chinch bugs are small sucking insects that feed on the juice in leaves and stems of grass, causing brown patches and eventual death of infested lawns. Chinch bug destruction is a growing problem around the country . . . but one you can solve with TRITHION.

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TRITHION gives quick, positive control. It's a fast-acting compound that controls *all* chinch bugs, even those resistant to other materials.



TRITHION is easy to handle safely. It is less hazardous to handle than many other organic phosphate pesticides. TRITHION is an easy-to-apply emulsifiable liquid . . . and also is available in granular form.

TRITHION offers one-shot control . . . that lasts. Repeat applications are rarely needed with TRITHION—"one-shot control" stops chinch bugs. Its long residual action means long-term protection . . . with resulting reduced costs.

Use TRITHION on *your* customers' lawns. You'll boost and *maintain* the demand for *your* service. For details, write Stauffer Chemical Company, Agricultural Chemicals Division, 380 Madison Ave., New York 17, N. Y. ©Stauffer's Reg. T.M. for an insecticide-acaricide

Ecology Is Keynote to Successful Waterweed Control, Delegates to 3rd Aquatic Weed Society Meeting Told

"Know the ecology of weeds and how to use plants to best advantage."

This was the tone set by keynoters at the Third Annual Aquatic Weed Control Society Meeting, February 12 and 13 at Chicago's LaSalle Hotel.

Dr. Daniel L. Leedy, Chief of Wildlife Research for the U.S. Fish and Wildlife Service in Washington, D.C., explained that sometimes complete removal of weeds from an area can do as much damage as when the area was choked with vegetation. He enlightened the 85 delegates about the two faces of weeds, citing examples such as the detrimental ragweed, cursed by hay fever sufferers, but a boon to bobwhites and hunters.

In the field of aquatics, Dr. Leedy related how cattails can make an area unusable for wildlife and man, too. But by really controlling, that is, manipulating the cattail environment, operators can make the most use of these areas by providing harborage for ducks, and give a chance for beneficial plants to grow. At the same time, the area is made more attractive for recreation and sports.

"In areas such as the Chesapeake Bay where water milfoil kills young oysters and hampers harvesting operations, a different degree of control is necessary. This must be a part of the applicator's decision on what to use and where to use it," he continued.

"Complete control is impractical and unwise," the wildlife expert went on, "since aquatic plants

oxygenate water, stabilize soils, reduce erosion, regulate water flow, provide spawning areas for pickerel, and provide homesites for fish food insects. If you eliminate all weed plants, you do have a problem," he maintained.

"Fenac, a terrestrial herbicide, is finding an application in aquatic weed control through combinations with phenoxy compounds such as 2,4-D and silvex," according to Amchem's Dr. John Gallagher, researcher for that company in Ambler, Pa., and member of the society's panel discussing industry progress on new herbicides.

"When used against alligator-weed, Fenac reduces the amount of phenoxy material needed for control. And when combined with Amitrol-T against water hyacinth, knockdown rate is increased," Dr. Gallagher continued.

First evidence of Fenac's effectiveness was provided by a USDA group from Denver working with pre-emergent herbicides on drained irrigation canals. At 20 pounds per acre of Fenac sodium salt applied to a canal bottom, 93 to 99% control of sago pondweed was achieved the next season.

For control in larger bodies of water, best results were obtained in embayments which are protected from running water. With a concentration of 1 ppm, Fenac controlled *Potamogeton pectinatus* in trials conducted in Canada, the Amchem field expert related.

"Most consistent results," Gallagher continued, "have been with pre-emergent treatment of unfrozen pond and lake bottoms during drawdown (lowering the water level). There is a definite period of time during which the chemical must contact the soil for best results. Tests along running streams have not been favorable due to greater water change, which prohibits sufficient contact time."

According to most recent findings, Fenac will be tested as a pre-emergent on pond and lake bottoms, as a total application to small ponds at 1 to 3 ppm, and as application to small lakes or ponds over ice at 10, 15, and 20 pounds per acre.

"More testing is required until we have established all the limitations and capabilities of Fenac," Dr. Gallagher concluded.

Ortho Division of California Chemical Corp. was represented by Dr. R. H. Cummings, Des Moines, Iowa, who related current studies with Diquat, Ortho's commercial product, and Paraquat, second of the quaternary dipyrindyl compounds, which is not yet registered for commercial use.

"These systemic compounds require light for phytocidal action," Dr. Cummings explained. "One interesting characteristic which can be used to economic advantage



Diquat was discussed by two Ortho representatives, Dr. R. H. Cummings (left) and Ben Quisenberry. Ortho manufactures Diquat.

is that application rates can be cut one-third, if Diquat is applied within one hour of darkness. Darkness gives the absorbed herbicide a chance to be freely translocated by the plant. Daylight then brings a rapid death. This cut rate in twilight gives the same results as the daytime application rate," he claimed.

While herbicidal action was formerly thought to be due to the salt, later work has shown that the cation (positive portion of the molecule) is the active ingredient. "Both previous formulations of Diquat of 4 lbs. per gallon and 2.8 lbs. per gallon of the salt contain 2 pounds per gallon of the cation. Dosage rates are now calculated on the basis of the cation content," Cummings elaborated.

"Because of this discovery, we now advise that anionic wetting agents such as alkyl sulfonates not be used, and that nonionic and cationic wetting agents may be used," he cautioned.

Diquat is presently registered for several aquatic species and tests are being conducted with both Paraquat and Diquat to de-



New tests with arsenicals for aquatic weed control were discussed by Leslie Reed (left) of Chipman Chemical Co. Here he talks with Robert E. Lucas of Ansul Chemical Co.

termine effectiveness against many others.

Foliage absorption is fast for both compounds, but contact with soil quickly inactivates them. For this reason, caution is advised when using Diquat in muddy water, which will also deactivate the herbicide, Cummings reported. Additional work is being done to determine if dosages will differ with types of soil, and if so, by how much, he continued.

Diquat is considered safe to fish and micro-organisms when used at correct dosages. Toxic levels of Diquat are 4 to 20 times the weed control level, the Ortho researcher stated. Studies are continuing and "are certain to give rise to important biological findings and produce many new commercial uses for these compounds," Dr. Cummings concluded.

Aqualin Works for 8 Weeks

Donald Lewis spoke for Shell Chemical Corporation's Aqualin, explaining that the active ingredient, 85% acrolien, is a general cell toxicant and has controlled weeds for 8 weeks when applied to running water.

Under a different label and concentration, Aqualin is used to control black algae in swimming pools



Both U.S. and Canadian government agencies were represented. Here are keynoters Dr. Daniel Leedy (left), USF&WLS and Canadian Dr. E. G. Anderson, who explained aquatic weed legislation.

in Southern California. Around paper mills and other plants which produce slimy wastes, Aqualin is formulated as a "slimicide" to reduce this unsightly occurrence.

"Biocide" is the name of Shell's Aqualin formulation which controls odor producing bacteria in water. Lewis also stated that International Shell has used an Aqualin formulation to control shistosome-infected snails in Africa. CAs should check registration of all products before attempting to use one for an untested or unregistered purpose, Lewis cautioned, in light of Aqualin's various end uses.

Pennsalt Chemicals Corp. was represented by Harold Lindaberry, Aurora, Ill., who spoke on the recent addition of Aquathol Plus to the Aquathol line.

Aquathol is a combination of dipotassium endothal and potassium silvex, 5% of each, so that active ingredients total 10%. "Its purpose is to broaden the spectrum of weeds controlled," Lindaberry explained. "Since some weeds are susceptible and others not, we hope to control both with this chemical."

As an example, he cited the case of milfoil and *Elodea* growing together or near each other. *Elodea* is resistant to endothal but can be killed with silvex, and milfoil is resistant to silvex but is susceptible to endothal, so both can be controlled with Aquathol Plus, according to Lindaberry.

Samples were distributed last year, Lindaberry said, in order to find the strong and weak points of formulation in on-the-job performance.

"Although we have had no trouble with mud, turbidity, or pH interfering with our tests, wave action causes difficulty when treating narrow margins. The turbulence causes excess dilution through diffusion," he explained.

"Aquathol is intended to give better control over a larger variety of mixed weed populations," Lindaberry summarized.

Casoron Examined

Casoron, a new compound produced by Philips in Holland and being developed in the United States by Thompson-Hayward Chemical Co. was explained by Dr. C. Allan Shadbolt, director of field research for the Kansas City firm.

Casoron was formerly known as Niagara 5996 and has the accepted common name of dichlobinil. It was originally developed as a pre-emergent herbicide, and only in the last year was its potential as an aquatic herbicide recognized, according to Dr. Shadbolt.

"The 4% granular form performs a little better than the more volatile wettable powder form for aquatic work," he stated.

Effective action of the herbicide against sago pondweed is presently down to 1 ppm, and 5 to 20 pounds per acre has controlled both American and sago pondweed for 4 to 5 months, Dr. Shadbolt claimed.

Spring applications of 5 to 20 pounds per acre will be preferred to fall applications. Best results in trials so far have shown that



Operator meets supplier. Wayne Smith (left) and David Shand (center) of Marine Research of Ontario quizzed Pennsalt's Fred Tempy.

dry beds of streams of narrow margins affected by a drawdown when treated with Casoron give best results. Soil incorporation improves control. An extended exposure time is necessary, so treatment is usually limited to non-running water.

Applicators Show Self-Made Equipment

The two-day meet was concluded with an applicator forum on equipment.

Shown by slides and film were boats, barges, and application systems devised and developed by applicators themselves.

Harry Walker, Harry Walker and Sons, Plainfield, Wis., explained the barge which he uses in aquatic weed work. It consists of a flat-bottomed steel barge 28 feet long by 8 feet wide. It has retractable wheels and is pulled on the highways by an International Scout with 4-wheel drive. It is equipped with electric brakes, stop, turn, and clearance lights. Propelled by a 40 hp. outboard, the barge can do 12 mph with a load of three tons, drawing 20 inches of water.

A full load, Walker explained,

Familiar face at weed meetings is that of Dr. Robert Hillbrant, aquatic weed expert from the Illinois Natural History Survey.





If applicators can't buy the equipment they need, they build it. This trio of operators, each of whom has experimented with new barges and sprayers, are (l to r) Harry Walker, E. Victor Scholl, and Henry P. Carsner.

is about ten 30-gallon drums of arsenite, with necessary pumps, motors, etc. A crew is three to four men.

A Gorman-Rupp Dual Fire Fighter is the pump apparatus used. It delivers 80 gallons per minute at 80 lbs. of pressure. Empty drums are generally kept on the barge and pumps transfer arsenite from the loading truck into the barge drums. Each 30-gallon transfer takes about three minutes.

For copper spraying, Walker uses two 55-gallon, plastic-lined steel drums. A small pump fills the drums with water so operators can premix the copper solution. Each 55-gallon drum takes about 30 lbs. of copper. While one is being sprayed, the other is being filled.

A brass fire hose nozzle, $\frac{1}{4}$ or $\frac{1}{2}$ inch, can shoot a stream of chemical 50 to 75 feet, if required.

Walker stressed the necessity for each man to know his job before beginning operations, because the noise on the barge limits conversation.

All men must be aware of the danger involved in handling the compounds which they use, and he cautioned the industry that "accidents and errors, caused by any of us, reflect on all of us."

Use Airboats Cautiously

Henry P. Carsner, Northwest Weed Service, Tacoma, Washington, showed the society how his firm makes use of shallow draft, airplane propeller-powered boats. Since many times, weeds develop in what Carsner called "formidable waters," the airboat now makes treatment of these areas possible. Where drawdowns are necessary, an airboat will ride over wet mud very smoothly.

Payload of Carsner's airboat runs around 5,000 pounds and

with improved designs of hull and controls, "a highly maneuverable and stable craft results."

Carsner added a warning thought to anyone wanting to develop an airboat: "Any propeller is a dangerous piece of equipment. It is capable of decapitating a person or effortlessly removing an appendage carelessly misplaced. The propeller must be fully enclosed in a suitable propeller guard." Carsner spoke as an authority, having had his left hand removed in a propeller accident.

Carsner told *Weeds and Turf* that he has seen cases where helpful bystanders could have been hurt by unprotected propellers because they want to help the operators push the boat away from or to the dock, and they cannot see the propeller because it moves so fast. "They could fall right into it," he stressed. He also suggested the use of electric start-



Proceedings of the Aquatic Weed Society Meeting were available to delegates on arrival. Here registration chairman Harold Lindaberry of Pennsalt (left) shows a copy to Dr. Duncan McLarty, University of Western Ontario, London.

ers so that the operator does not have to be near the moving propeller.

A talk on closed injection systems was presented by E. Victor Scholl, Modern Weed Control, Grand Rapids, Mich.

A closed system places the chemical into the water through

a tube or tubes under the surface.

Scholl has taken a 1-inch steel pipe and brazed half-hose couplings into it, each about a foot apart; the total length of the pipe is around 20 feet. There is a universal joint on each side of the square barge's bow which permits the steel pipe to be retracted along side, just under the rubrail.

Two-foot lengths of rubber hose, fitted with the other half of the hose couplings, are screwed onto the brazed couplings. Then as the barge progresses through the water, the chemical, usually Aqualin, according to Scholl, is injected under the surface.

Another innovation on his barge is a 16-foot extendable pipe for reaching under docks and floats. This long "wand" is mounted on rubber rollers across the bow, so the operator can easily extend it, left or right. A hose also hangs downward from the end of the pipe. In order to keep the hose straight down into the water, a 1-inch lead pipe weight is fitted to the end.

Elect New Helmsmen

Officers for 1963 elected at the meeting, presided over by 1962 president Paul Eller, Chipman Chemical Co., Chicago, were: Henry P. Carsner, president; Charles L. Bolster, 1st vice president, Pennsalt Chemical Co., Philadelphia, Pa.; Kenneth Mackenthun, 2nd vice president, Robert A. Taft Environmental Health Center, Cincinnati, Ohio; Edward Bacon, secretary-treasurer, Michigan Conservation Department, Jackson.

The 1963 Board of Directors consists of Paul Eller and Robert Huckins, Chipman Chemical Co., Chicago; William Fox, Chipman Chemical Co., Hamilton, Ontario, Canada; Roy Younger, Consulting Biologists, Inc., Spring House, Pa.; and David Shand, Marine Research of Ontario, Peterborough, Ontario.

Success brings smiles, and these 1963 officers of the Aquatic Weed Society are obviously happy about this year's meeting. Elected were: (front row, l to r) Charles P. Bolster, first vice president; Henry P. Carsner, president; and Kenneth Mackenthun, second vp. Standing are (l to r) Paul W. Eller, director; Edward Bacon, secretary-treasurer; and Robert Huckins and William Fox, both directors. Absent directors are David Shand, Roy Younger.



Panogen Turf Fungicide

(from page W-12)

control turf diseases, it is important that the active ingredient is brought in intimate contact with the grass leaf and with the soil surface. Fungi which cause diseases may be present both on the grass and on the soil surface. To accomplish most effective distribution, Panogen Turf Fungicide has to be diluted with a suitable amount of water. Recommended rates of application range from 1½ to 3 fl. ounces per 1,000 square feet of turf area. For best distribution, it is suggested that these quantities be diluted with 10 gallons of water per 1,000 square feet.

Equipment needed for application ranges from sprinkling can to power sprayer, depending on the size of the area treated. Excellent results and ease of application are all accomplished by using devices such as Hozon applicators or other proportioning equipment.

When to Treat

Panogen Turf Fungicide can be used either for prevention of turf

diseases or for control of the spread of already established diseases. Preventive treatment is advisable since disease which has already occurred may have thinned out or damaged the turf to such an extent that it will take some time for new grass to fill in.

Several applications are necessary for all diseases, since new fungus is carried in by air currents, with rain, and from traffic over the grass areas. For dollar spot, copper spot, and brown patch, 1½ fl. ounces should be applied at approximately 7-day intervals. For melting out and fading out, 3 fl. ounces should be applied at 10-14-day intervals. Applications should be started as soon as the grass greens up in the spring.

To prevent snow mold, use 3 fl. oz. of the chemical in 10 gallons of water, and spray, particularly in areas where snows may accumulate or where snow mold is known to appear. This treatment should be repeated at least once during midwinter thaws.

It is best to treat with PTF in the morning or in the evening when temperatures are moderate.

For more information on turf diseases, refer to the Nov. '62 issue of Weeds and Turf, page W-1, "How to Control Turf Diseases." Ed.

For best results the lawn should be mowed the day before treatment and clippings removed.

Establishing New Lawns

A use of Panogen Turf Fungicide which may prove exceedingly valuable is in establishing new turf areas. Much of the sprouting grass seed may succumb to seed rot or damping-off diseases, especially if weather conditions are adverse. Fungi causing damping-off are ever present in the soil. Applying PTF at time of seeding will serve as an insurance that the grass seed will not be attacked by harmful fungi and that an even, healthy stand of grass will result. For new turf areas, apply the fungicide diluted at a ratio of 3 fl. oz. per 10 gal. of water per 1,000 square feet to the area prepared for seeding. Plant grass seeds over treated soil in usual manner and water thoroughly.



Kills All Vegetation!
CHLOREA®
GRANULAR
Stops New Growth!

Saves labor, improves maintenance, prevents vegetation fire hazard! A powerful weed and grass-killing combination in dry, pelletized form . . . easy to apply with spreader or by hand. Use around storage yards, parking lots, fence rows and other areas where complete, long-lasting vegetation control is needed. Apply early for best results.

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A LITTLE GOES A LONG, LONG WAY
This small amount kills over 50 square feet of vegetation . . . 400 pounds treats an acre.

34th International Turf-Grass Show Draws 1300;

Delegates Study Soil Fumigation, Turf Diseases

Who appreciates fine turf more than the men and women who play on America's lush golf greens?

Probably the golf course superintendent, whose job consists largely of maintaining these healthy stands of grass. And nowhere was this concern more apparent than at the 34th International Turf-Grass Conference and Show, February 11-14, in San Diego, Calif.

Nearly 1300 delegates gathered at the El Cortez Hotel's convention center for the annual affair, which is sponsored by the Golf Course Superintendents Association of America.

While attendance is primarily confined to golf superintendents, the meeting features yearly a regular series of educational lectures and seminars devoted to study of turf diseases, insects, fertilizers, and maintenance equipment. For this reason, much of this year's program contained information useful to contract applicators, particularly those who treat golf courses, or act as advisers or consultants.

Also of interest to CAs is the annual trade exhibition, which shows off the latest in chemicals and equipment for turf care. In San Diego this year, delegates were treated to a lavish display of new spray rigs, aerifiers, verticutters, chemicals, and related materials.

This is the largest turfgrass show in the world, according to Dr. Gene C. Nutter, GCSAA Executive Director.

A practical discussion of con-

tract soil fumigation on golf greens was one conference highlight significant for golf men and contract applicators alike.

Explanation of this relatively new technique (*W & T*, Feb., p. W-8) came from Donald E. Leaman, Technical Director, Agricultural Chemical Sales, Neil A. Maclean Co., El Monte, Calif.

Leamen described the soil fumigant methyl bromide as "a tremendous herbicide which permeates very fast."

It is important that soil be properly tilled and moist before fumigant is applied, Leamen reminded his audience, or some seeds will not germinate and thus be killed. While most weeds are vulnerable to MB, the Californian continued, the chemical will not kill seeds of either cheeseweed or clover.

Chloropicrin Good Fungicide

Many chemical preparations now used for soil fumigation contain chloropicrin, a good fungicide, Leaman said. In combination with MB, which kills the weeds, chances for healthy turf are greatly enhanced.

Large equipment that automatically lays tarps, under which soil is fumigated, and especially designed injectors, have been developed for soil fumigation jobs, Leaman went on. Drawback here is that on some courses, heavy machinery may cause compaction of the soil, which reduces the opportunity for vigorous grass growth.

"Top Turf Tip" Panel

A unique feature at the 34th Turf-Grass Conference was a panel

of university experts from western states which offered turfmen their latest research findings.

Featured on the panel were Dr. Leland Burkhart, Director of Horticulture, University of Arizona, Tucson; Dr. Norman R. Goetz, Extension Weed Specialist, Oregon State College, Corvallis; and Dr. Charles J. Gould, Plant Pathologist, Washington State University, Puyallup.

In the Pacific Northwest, Dr. Goetz said, prolonged winter rains and mild temperatures create turf disease epidemics. Proper winter treatment is necessary, particularly in turf planted in areas of high altitude, and especially that planted to fescues and ryegrass.

Another big problem is thatch control. "After all, in the Pacific Northwest, we raise the best thatch in the U.S.," the Corvallis scientist joked. Reason for this, apparently, is that low soil temperatures make thatch hard to decompose.

Four Big Diseases in the West

Dr. Goetz was followed by Dr. Charles J. Gould of the Western Washington Experiment Station in Puyallup.

"In the Pacific Northwest," the plant pathologist began, "our four major turf diseases are *Fusarium Patch*, *Corticium Red Thread*, *Typhula Snow Mold*, and *Fairy Ring*."

Nationwide, the diseases of most concern are *Brown Patch*, *Dollar Spot*, *Helminthosporium Blights*, and *Fairy Ring*. (See *W & T*, Nov. 1963, p. W-1).

While cultural controls are naturally obligatory, Dr. Gould believes it is still necessary to depend largely on a fungicide for disease control.

But the best fungicide, applied improperly, is of no use. For this reason, the scientist continued, watch carefully how applications are made. For example, (1) use a suitable measuring cup (not a metal one which is so beat up it no longer holds the amount it once did, and certainly not a soft drink bottle); (2) use a meter for proper calibration of spray equipment; (3) mow before ap-



Intent on improving turf care techniques, delegates to the 34th International Turf-Grass Show listened to introductory speeches by Dr. Gene C. Nutter, GCSAA Executive Director (at podium) while association president, Sherwood Moore (seated, right) and San Diego Mayor Charles C. Dail, (seated, left) waited to address the 1300 delegates.



TURF:

One application of dieldrin controls major turf pests for an entire season

Dieldrin controls soil insects such as Japanese beetle grubs, white grubs, sod webworms and ants. These insects feed on grass roots, cut off nourishment and moisture and cause browning and bare spots.

Dieldrin also controls annoying, health endangering surface pests such as ticks, fleas and chiggers. Here are the details.

Now is the time to size up your turf insects problem and do something about it.

If you cannot start healthy, vigorous grass growing in certain areas, or if you have bare patches, soil insects could be the cause.

Turn up some sod in these trouble spots and sift through the dirt. See if you don't find grubs or some other evidence of soil insects.

Long-lasting dieldrin protection

If these soil insects are your problem, you can control them with dieldrin.

A single application lasts for a year or more. It protects roots—lets them utilize maximum nourishment and moisture.

Dieldrin can be applied in a number of ways. It can be sprayed on as a

liquid or applied in granular form with a fertilizer spreader. Dieldrin is also available in fertilizer mixtures. This lets you combine the two operations and saves time and money.

Controls ticks, fleas and chiggers, too

Dieldrin also controls ticks, fleas and chiggers. These pests are not only annoying, but also are public health problems.

In addition to applying dieldrin to turf, to get maximum control of these above-ground pests, treat weeds, the ground around low-growing shrubs and buildings—anywhere these pests might take refuge.

Where to get dieldrin

Dieldrin is available from your local insecticide dealer under many well-

known brand names. Accept no substitute. Check the label or the ingredient statement on the formulation you buy for the name *dieldrin*.

Shell Chemical Company, Agricultural Chemicals Division, 110 West 51st Street, New York 20, New York.

Control all these turf pests with dieldrin

European chafer grubs	Cutworms
Green June beetle grubs	Sod webworm
White grubs	Armyworms
Northern masked chafer grubs	Sowbugs
Asiatic garden beetle grubs	Pillbugs
Oriental beetle grubs	Snails
Japanese beetle grubs	Wireworms
Earwigs	Root maggots
Ants	Slugs
Striped grassworm	Chiggers
Mole crickets	Fleas
	Ticks



dieldrin

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plying a fungicide so maximum penetration results; and (4) watch out for proper coverage, because a distracted sprayman may miss a section.

Impurities from dirty water will inactivate many mercurial compounds, Dr. Gould warned, so use clean (but not necessarily distilled) water for dilutions.

Another problem is rusted equipment, also of particular harm to mercury compounds.

Dr. Gould concluded that these guides, followed closely, would not be effective unless the individual in charge of a turf area is familiar with the regional differences and peculiarities which affect local grasses.

In Dr. Burkhart's discussion, particular attention was focused on types of trees for golf course ornamentation.

More attention to the Northwest came from another Washington State University expert, Dr. Roy L. Goss, Assistant Agronomist and Extension Turf Specialist at the Western Washington Experiment Station in Puyallup.

There is a great variety of soil

type and climate in Dr. Goss's region, and this is one of the reasons why he insists on the importance of a soil test.

Many devices are available for conducting such tests.

Dr. Goss said compaction and drainage problems are partially responsible for the loss of bent-grasses and invasion by *Poa annua*.

But at least, he continued, dandelion and plantain are not much trouble since the advent of 2, 4-D.

Five kinds of fertilizers, which through various devices give off nitrogen for longer periods than ordinary growth stimulants, were reviewed by Dr. O. R. Lunt, Associate Professor of Agronomy, University of California at Los Angeles.

These slow-release fertilizers are one of the following types: (1) coated; (2) low solubility; (3) organic; (4) synthetic organic; and (5) ion exchange.

Dr. Lunt said the last method, which he called a somewhat obscure chemical process, is only of "academic interest."

Success has been achieved, the

scientist went on, with soluble fertilizers which have been coated with a membrane. When such a coated fertilizer is placed in moist soil the nutrients diffuse out at a very steady rate for two or three months, depending on the soil compaction.

Materials with limited solubility, such as metal ammonium or potassium phosphates, are capable of supplying nitrogen, potassium, or several micronutrients to the soil at slow rates.

"But the high phosphorus-nitrogen ratio of metal ammonium and potassium phosphates makes these materials best adapted to single or occasional use," Dr. Lunt warned.

Trade Show Adds to Conference

Educational programs at the International Turf-Grass Conferences are run for half-days only, to give delegates a chance to explore the extensive trade show area, where suppliers are on hand all day to give out samples, demonstrate equipment, or talk about current turfgrass problems.

While some equipment on display, such as golf carts and green markers, are of little practical interest to custom sprayers, the major portion of the exhibits are concerned with care of turf.

Manufacturers of such chemicals as insecticides, fungicides, weed-killers, and fertilizers were on hand, as were the companies which make sprayers and dusters to apply the compounds.

GCSAA Elects Nelson

Included in the conference also is the annual business meeting of the Golf Course Superintendents Association of America, which this year elected Roy W. Nelson as 1963 president.

Nelson is from the Ravisloe Country Club in Homewood, Ill.

Philadelphia was chosen as 1963 meeting place, Dr. Nutter told *Weeds and Turf*. Convention site is the Sheraton Hotel, and dates are Feb. 9-14.

Contract applicators who want to attend the meeting to hear the educational discussions and view the suppliers' exhibits are welcome, Dr. Nutter said. All delegates are expected to pay the usual registration fee, the GCSAA Executive Director informed *W & T*.

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