

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.

