without crabgrass it's much easier to grow bluegrass or other desired grasses.

We would readily agree that everyone expects the ground to be covered with something by July 4. Therefore, one of the problems of wise crabgrass preventer use has been to indoctrinate consumers with the idea that they should have turf worth protecting before using such compounds.

Over-seeding and Preventer Use

All producers and distributors of crabgrass preventers have faced the dilemma of the consumer's wish to over-seed ritualistically. The habit of over-seeding, so thoroughly ingrained, has raised questions concerning the use of crabgrass preventers. For this reason all companies have needed, but few have had, adequate realistic data on the preferential survival of bluegrass seedlings when crabgrass preventers were used at adequate toxic rate. It is obvious that anybody anywhere can over-seed concurrently with using anything, but the criteria of success is the uniform, normal establishment and survival of seedlings of the desired grass which will contribute to the turf cover. There is a big difference between over-seeding and getting a stand of seedlings. In fact, failure in over-seeding is most common just because people do not keep the seed and seedlings constantly moist. Failure is augmented by competition and by disease, so always it has been a problem to determine the success of such an over-seeding.

A general suggestion, based on observation and understanding of the problem, is that consumers are wise to have turf worth protecting before one decides to use crabgrass preventers. And conversely, if over-seedings are badly needed, then it is suggested that they make their over-seedings as early in the spring as possible. Use crabgrass killers along with weed control during the summer and fall, and be prepared to use crabgrass preventers one year later.

On occasion very early over-seeding, combined with rather late crabgrass preventer use, could be very successful if all goes well. Admittedly these are tediums of management over which manufacturers and distributors often have little control, but they are important to the sales of distributor groups and consumer's satisfaction. Fortunately just the prevention of weedy grass competition, combined with good turf management, gives the consumer a much better chance to maintain the desired grass.

Recommended Rates

Table 1 outlines the several chemicals available and general items concerning their use. With several products there are fringe benefits, such as knotweed control, long-term residual, or better selectivity. For the novice the prime purpose is the prevention of crabgrass competition, and in this area terrific progress has been made and more will be made. The turf manager may be very careful to select the chemical that fits his long-term management program.

Nine compounds are available in numerous formulations for seedling grass prevention. These have been tested repeatedly at numerous experiment stations, and the data resulting therefrom has been quite carefully assayed by the companies producing the basic chemical.

Currently the labeling on most formulations is quite adequate. Nevertheless, one of the real problems with crabgrass preventers is their proper use by the applicator for each individual situation. Table 1 gives chemical designation and comments, and indicates the relative carry-over.

Post-emergence Control

Post-emergence is a useful tool against established susceptible plants—crabgrass, foxtails, dallis grass, sandburs, johnsongrass, and several others. Often crabgrass develops severe competition before killing is achieved. Also any discoloration, burn, or thinning or damage, may weaken the desired turf.

Two applications, good soil moisture, and active growing grasses are desired for best results with the several formulations of popular organic arsenicals.

Turf managers, homeowners, and contract applicators alike now have adequate chemicals to selectively "keep crabgrass out." The need to wisely grow a dense turf becomes even more important in the face of this growing technology.

Table 1. Chemicals and Comments for Pre-emergence Herbicides

Chemical designation	Active ingredient rate lbs.	Residual time	Estimated carryover %	Next season apply	Comments
Zytron	15 A/A	1 season plus	50	.5+	Controls knotweed
Dacthal	10 A/A	2 months	0	full	Quite safe
Betasan	15 A/A	1 season	0	full	Newer compound
Azar	10 A/A	1 season expected	?	?	New in '64
Diphenatrile	30+ A/A	1 season	0	full	Safe on flowers
Trifluralin	1.5 A/A	1 season	0	full	Controls knotweed
Bandane	30+ A/A	1 season	50?	.5+	
Chlordane	80 A/A	1 season	50	.5+	
Lead arsenate	20 F/M	1 season plus	80	.25	Powdery—caution
Calcium ars.	12-18 F/M	1 season plus	75	.25	Granulars preferred
Ca. Propyl Ars.	6.25 F/M	1 month plus	0	full	Fast acting

Diphenatrile and Trifluralin are used together at lighter rates of each. (Even with nine basic formulations of pre-emergence herbicides now available, continued research and additional chemicals can be expected.)

Optimistic Weed Society Sets New Goals, Reflects On Accomplishments at Biennial Meeting in Chicago

A fast-moving and fast-growing Weed Society of America which desires, in this era of scientific revolution, to move ahead even faster, met for its fifth biennial meeting, Feb. 10-13, at the Pick-Congress Hotel, Chicago, Ill.

Seven hundred delegates representing education, research, government, industry, and several foreign scientific agencies gathered to review important research developments of the past two years and to plan for an even more fruitful future.

A baker's dozen of "needs for the advancement of weed science," as this discipline will henceforth be called, was enumerated by Dr. Warren C. Shaw in his Presidential Address at the opening general session. Dr. Shaw is a plant physiologist at the Beltsville, Md., research station for the U. S. Department of Agriculture Crops Research Division. He is Leader for the Weed Investigations phase of crop protection.

"There is a critical need for a better understanding of the ecology, phenology, and botanical aspects of weeds," Dr. Shaw began. "There's a lack of basic knowledge regarding weed seed germination process."

"We need to know more about the chemicals (inhibitors, stimulants, growth-promoting and toxic substances) produced by seeds and roots of plants. There is a gap in our understanding of the herbicidal penetration, absorption, translocation, and movement factors which influence chemical efficiency," he continued.

"We need information on the interacting influences of herbicidal mixtures and combination treatments," he went on. Other areas which are becoming increasingly appreciated, Dr. Shaw pointed out, are in the chemistry of surface active agents (surfactants) in formulations, understanding of herbicidal action mechanisms, and investigation into fate of herbicides in soil and water.

Researchers must continue to consider, according to the WSA President, the interrelationships of effects on plants of treatments with herbicides in combination with insecticides, fungicides and other pesticides.

Secretary Freeman Gets Ovation

Special honor for WSA was the presence of U. S. Department of Agriculture Secretary, Orville L. Freeman, who, after a standing ovation, addressed the group on "Science and Education: A New Awareness." Secretary Freeman's talk centered on the administrator's viewpoint of promising new developments from USDA and some comment on the recent uproar in Senate chambers of the Ribicoff Committee caused by the controversial book, *Silent Spring*.

"Pesticides are a springboard to abundance, but as chemicals designed to remove insects and weeds from our environment, they are always a potential danger," the Secretary stated. "Public discussion has sharpened our awareness of two problems: residues and lingering effect, and the possible misuse at time of application. One can use them properly with confidence." This the secretary described as the basic finding of the Senate Ribicoff Committee.

International flavor was added by the presence of Dr. Wybo vanderZweep (above right), a Dutch weed researcher who compared notes with USDA's Peter Frank (above left). Industry and research met as Diamond Alkali's J. W. Daniel (below left) talked turf with Iowa turfgrass specialist Dr. Eliot C. Roberts.

The position of the USDA has shifted in the past two years, Secretary Freeman observed, now emphasizing nonchemical control methods of harmful organisms. "Where problems must be met, and cannot be met by means other than chemical control, we will find the safest possible techniques for using a pesticide."

As a followup on biological control of weeds with such notable examples as the Klamath beetle on Klamath weed (St. Johnswort), the Cabinet member announced, "a few weeks ago the Department said that a flea beetle which survives only on alligatorweed has passed tests conducted in South America and will be introduced into the Southeast where this weed chokes miles of waterways."

Second honored guest on the program was Dr. Wybo vanderZweep from the Institute of Biological and Chemical Research on Field and Forage Crops, Wageningen, The Netherlands, who discussed some recent advances in European weed control.

Dr. vanderZweep revealed the organization of the European Weed Research Council (EWRC), which is a body of researchers from 21 countries come together to correlate research efforts in their respective countries. "In Europe," the Dutch researcher revealed, "there is a lack of personnel to do research which hampers us, in addition to the language barrier between countries."

European research already has significant accomplishments for which credit is due. Among chemicals which have originated in European laboratories are the dipyridyls, Diquat and paraquat, the triazine compounds, and recently dichlobenil.

Chemist Explains Surfactants

"Surfactants are minor additives to herbicide formulations which can play a major role in toxicant emulsification, wetting, penetration, and in response of plants to treatment," R. W. Behrens, Atlas Chemical Industries,

Wilmington, Del., asserted in his opening remarks on this new phase of herbicidal chemistry.

"Basically a surfactant, which is a shortened form of "surface active agent," denotes 1 molecule with 2 characteristics: one which is attracted to water and the other which is attracted to oils," Behrens explained. Use of surfactants creates an interface between oil and water molecules in an emulsion which keeps emulsions stable longer and increases the activity of the herbicide on the sprayed surface.

With use of properly prepared surfactants, Behrens indicated, herbicide rates can be lowered because there is a much more intimate relationship between herbicide and carrier and surface.

Problems yet to be resolved in the widespread use of effective surfactants are the residues produced and the "biodegradability" (how these chemicals will respond when placed in soils and water supplies).

Due to the broad scope of the WSA program in both agricultural and nonagricultural endeavors, *Weeds & Turf* reporters sifted those developments from the program which should be of most interest to readers.

Tordon, New Brush Killer

Many new chemicals were talked about and researched this year at the WSA meet. Among those was Dow Chemical's Tordon (4-amino-3,5,6-trichloropicolinic acid), a new brush killer. Technical representative Robert Warden described Tordon at a session devoted to discussion of new herbicides from industry.

"Tordon is a growth-regulator herbicide which shows promise for control of woody plants both as a foliage application and as a cut-surface application such as injection and frill treatments. It is also effective against persistent perennial species such as leafy spurge, Russian knapweed, field bindweed and Canada thistle," Warden claimed. It is presently being formulated experimentally as a granular material, a mixture with 2,4-D, and a liquid potassium salt. It is being released to qualified experimenter-applicators for testing purposes.

New Hyvar Bromacil Bows

L. A. Conn of DuPont introduced Hyvar X-WS bromacil

Surfactant expert R. W. Behrens (left) of Atlas Chemical Industries was one of several popular speakers who paused to chat with the new president of the Weed Society of America, Dr. G. F. Warren of Purdue University.

industrial weed killer, a water-soluble postemergent herbicide which does not need additional agitation after initial mixing. Conn said that this herbicide will be available for use by April 1. It has recently received federal registration. DuPont researcher, Linton Cowart, reported that 4 pounds per acre on railroad ballast gives comparable control to sodium chlorate. Ten pounds per acre gave two years of excellent control on railroad ballast.

Another new nonselective weed and brush killer from General Chemical Division of Allied Chem. Corp. is GC-7887. Technically known as hexafluoroacetone trihydrate, this product is intended for use for postemergent control of annuals and perennials and can also be used on certain woody species, according to Roger L. Pierpont, company representative.

Turf Weeds Spotlighted

O. M. Scott & Sons researcher, John A. Long of Marysville, Ohio, presented results with test using dicamba (Banvel D) in turf plots. "Dicamba has given excellent control of red sorrel and white clover at 2.6 lbs. per acre. When used at a 4-lb.-per-acre rate, a wait of only 14 days is necessary before reseeding," Long revealed.

Dicamba can be applied to new stands of bluegrass and Chewings fescue after these plants reach the 4 to 5 leaf stage with no damage. "When used at the 2-lb. rate, workers should avoid application about root zones of ornamentals since these may be damaged," Long cautioned.

"Dicamba can be used at a ½-lb.-per-acre rate on bentgrass to remove white clover, which the dimethylamine salt of 2,4-D will not do, and only a slight temporary discoloration occurs," S. W. Bingham, Virginia Polytechnic Institute, Blacksburg, reported in a second paper which emphasized the usefulness of dicamba.

"Winter weeds, both annual and perennial, can be controlled with paraquat while southern turf is dormant," Carl O. Hanson, California Chemical Co., Ocoee, Fla., said as he presented correlated results of university researchers using paraquat this past year. Although paraquat will kill actively growing turf, it can be used with safety to remove unwanted winter weeds which occur in the dormant grasses. "One pound per acre applied in the spring has provided best control with no damage to centipede grass or Tifgreen Bermuda," Hanson related. He cautioned against use of paraquat on St. Augustinegrass because it has exposed aboveground stolons which may be affected even when dormant. When this technique of winter lawn renovation is used, the applicator should spray to wet the undesired foliage and not to drench the whole lawn. Ortho Division of California Chemical expects an early registration of paraquat for this use.

New Herbicide Concept Brewing

A new look at herbicide use through stunting of plants with a compound produced by biological organisms, such as Penicillium molds, was presented by the discoverer, Dr. Reed A. Gray, formerly with Merck Sharp & Dohme and now working with Stauffer Chemical Co., Mountain View, Calif. A compound called hadacidin is the active ingredient in a broth extracted from cultures of fermenting molds made of *Penicillium* spp.

When this broth is sprayed onto plants, it stunts their growth and with sufficient concentration will kill plants. The compound, however, does not have a desired selectivity, but the principle of control emerging from this new possible control compound excited many of the research delegates.

Machines De-Weed, Renovate

"Machinery can help renovate

(continued on page 23)

ANNOUNCING

A New Selective Pre-Emergence Herbicide for Crabgrass Control

AZAR*

It Combines Effectiveness, Persistence, Turf Tolerance, Low Toxicity, Economy, and Substantially No Odor

Azar* is a new carbamate herbicide for pre-emergence application to control crabgrass. Applied before crabgrass season, it acts to prevent germination and initial growth. Azar is recommended for use only on established lawn or other ornamental turf, at the rate of 10 lbs. of active compound per acre.

ADVANTAGES

Azar is effective for crabgrass control at an economical rate of application. It is persistent enough, does not evaporate or readily leach out of the soil, so that one application can be effective all season long.

Most commonly planted turfgrasses, once established, are tolerant to Azar at the recommended rate. These include red fescue, bent, common Kentucky bluegrass, Merion bluegrass, St. Augustine, centipede, zoysia, hybrid and common Bermudas, and Dichondra.

Based on available data, Azar can be classified as "practically nontoxic" to humans and warm-blooded animals (as defined in "Clinical Toxicology of Commercial Products," Gleason, Gosselin, and Hodge).

Azar has another important advantage in that it is substantially odorless in powder form and in water suspension.

AVAILABILITY

Azar is available this season as an 80% wettable powder, Azar WP-80, which disperses readily in water for use in conventional spray equipment. Manufacturers can formulate Azar WP-80 in granular form, using conventional carriers. For further information write Hercules Powder Company, 910 Market St., Wilmington, Del. 19899, or any Hercules district office listed below.

HERCULES

*HERCULES TRADEMARK

SZ64-1

BOSTON, MASS.; DALLAS, TEX.; GREENVILLE, MISS.; LOUISIANA, MO.; MONTGOMERY, ALA.; RALEIGH, N. C.; SAN FRANCISCO, CALIF.

Examples of water weed ecological factors which puzzle controllers, and presentation of research developments leading to better controls, occupied 100 members of the Aquatic Weed Control Society meeting at Chicago's Palmer House, Feb. 11-13. Two days of its schedule was in joint session with the aquatic section of the Weed Society of America biennial conference at the Hotel Pick Congress, also in the Windy City.

Major emphasis placed on ecology and ecological shifts (vegetative successions) in waters of the Northeast, Midwest, and Western irrigation systems

Questions were exchanged freely by aquatic weedmen. Noted aquatic applicator Bernard Domogalla (center) and his assistant Rene Weber (right), quizzed Geigy rep James Flanagan about his firm's herbicides.

Fact-Seeking Aquatic Weedmen Stir Up More Questions Than Answers at 1964 Chicago Meet

brought to light many examples of problems confronting controllers regularly.

Leading a trio of experts who presented peculiarities of their regions was Jason Cortell, Consulting Biologist, Brookline, Mass.

"A pond is a body of water which has its littoral (edges) and limnetic (open water above the light penetration level) zones more highly developed than the profundal (deep cold water without vegetation) zone; whereas a lake, properly defined, has a greater profundal zone," Cortell explained, answering questions as to why New England has so many large "ponds."

Lake studies conducted by Cortell attempt to show what happens to the flora of a lake or pond after chemical treatment has been applied.

Preliminary results of this study indicate that there are transition stages of plant growth following chemical applications. First species which becomes dominant in most cases after treatment is the notably resistant *Nitella*, an algae that resembles higher plants.

Nitella, Cortell feels, is a balancing influence in a treated water body and remains dominant until flowering plants become reestablished. To date, the *Nitella* succession or shift is the only pattern Cortell has been able to detect. Secondary reestablishment does not seem to follow a noticeable pattern, Cortell revealed.

Ponds Change Without Chemicals

Over a three-year period, Dr. Robert C. Hiltibran has observed ecological shifts in several ponds near Urbana, Ill., where he teaches at the Ill. Natural History Survey.

In one pond, Hiltibran noted a shift from watermilfoil and *Najas* sp. growth through a mixture-stage of watermilfoil, sago pondweed, *Najas* sp., and *Potamogeton* sp., finishing in 1963 as mainly *Potamogeton* spp. and sago pondweed *(P. pectinatus)*. Watermilfoil was dominant in 1960, and *Najas* sp. was dominant in 1962. Shifts such as this without the "aid" of chemicals require more knowledge of the innerworkings of water bodies, Dr. Hiltibran feels.

A shift, similar to Cortell's *Nitella* succession, was noted by Dr. Hiltibran in another study involving control chemicals. In this midwest pond, the dominant plant, after chemical removal of a complete crop of *Potamogeton crispus*, was *Chara* sp., an algae related to *Nitella*.

The following year, according to Dr. Hiltibran, plankton algae were active (in bloom) all summer and by fall there were no weeds found in the pond. "Nature through turbidity and algae growth often cleans up lakes and ponds," Dr. Hiltibran stated, but no experts can explain the details of this phenomenon.

A delegate from the floor commented that even when only a small portion of a pond may be treated, the results are sometimes complete control over the whole pond. This appears not to be a result of chemical diffusion, but rather a "snowballing effect" of dead weeds killing more weeds. This likewise was not explained.

"Part of the ecological problem with aquatic weeds in western irrigation systems is the type of soil the channel is dug

Brains were pooled by a trio of smiling experts. Dr. Duncan McLarty (left) from Canada exchanged views with Floridian Dr. Lyle Weldon (center) and Massachusetts consultant Jason Cortell.

a new concept in insect control

THURICIDE® 90T* FLOWABLE
MICROBIAL INSECTICIDE

*Trade Mark of Bioferm Division, International Minerals & Chemicals Corp.

Stauffer announces a new concept in insecticides—a new approach, a selective *biological* insecticide. And because of its selectivity there is less risk of harmful side-effects from drift—less risk of harming children, pets, fish and wildlife, plants or beneficial insects.

Five years of research and extensive field testing is behind THURICIDE 90T FLOWABLE microbial insecticide. It is the product of a new era in science. Now Stauffer makes it available in quantity to the pest control industry.

Man lives in a veritable sea of microorganisms—we are literally surrounded by them. Fortunately, the overwhelming majority are friendly, useful organisms. Some of these are antagonistic to other lower forms of life. This is the principle behind THURICIDE 90T FLOWABLE!

THURICIDE 90T FLOWABLE is a microbial insecticide, not a chemical. It is a suspension of spores of *Bacillus thuringiensis* Berliner – a useful bacterium in suspended animation.

THURICIDE 90T FLOWABLE is selective. It affects only the leaf chewing larvae of many moths and butterflies such as cabbage looper, tomato and tobacco hornworm, gypsy moth and cankerworm. Only the leaf chewing larvae in the order Lepidoptera are affected.

THURICIDE 90T FLOWABLE is stable. It can be stored under normal conditions for an indefinite period of time without losing potency. It spreads well and sticks to foliage and remains completely inert until eaten by caterpillars.

Use THURICIDE 90T FLOWABLE the next time you have a worm problem. It is the new approach—the selective approach that produces results with greatly reduced risks.

Learn more about THURICIDE. Return the coupon for the new leaflet, "A revolutionary concept in insect control." Stauffer Chemical Company, Agricultural Chemical Division, 380 Madison Avenue, New York 17, N.Y.

Stauffer CHEMICALS

STAUFFER CHEMICAL COMPANY
Agricultural Chemical Division
380 Madison Avenue, New York 17, N. Y.

Please send me the leaflet on THURICIDE, "A revolutionary concept in insect control."

Name_____

Address_____

City_____

State_____

through," Delbert Suggs, U.S. Department of Interior, Bureau of Reclamation, Ephrata, Wash., declared.

"Although many canals are 80 miles long, we find most ecosystems do not exceed 12 miles," Suggs continued. An ecosystem in water is a relatively stable environment of interacting organisms and inert chemical elements. Suggs indicated that canal soil conditions change in both composition and direction ("grain") and tend to cause changes in ecosystems.

"We find highest weed infestation in canals dug in loam soils. Slowest infestation occurs in soils with 50% silt loam," he stated.

"Sago pondweed will infest a new canal at the rate of 3 to 4 miles per year," he added, defining the major weed problem in irrigation canals. Sago grows singly and in floating mats which clog filters and sprayers in watering systems.

Warmed up to these strange twists in aquatic weed control, delegates were very attentive to subsequent sessions dealing with less practical, but equally important aspects of aquatic weed control.

Diquat Continues to Prove Useful

Potamogeton species, previously listed as hard to kill, have shown in tests conducted by Dr. Hiltibran to be susceptible to diquat at 0.5 and 1.0 ppm (parts per million).

Some of the susceptible species are: *P. pectinatus*, *P. crispus*, *P. foliosus*, and *P. pusillus*. American pondweed, *P. nodosus*, was not damaged by surface applications of diquat, according to Dr. Hiltibran.

Northern watermilfoil, white water buttercup, and coontail also succumb to 0.5 ppm of diquat, but regrowth of elodea occurred even at the 1 ppm rate, the Illinois expert's work showed.

Fifty millileters of diquat in 1 gallon of water was effective on several emergent weed species when applied as a foliage spray. Among susceptible species are common arrowhead, waterwillow, creeping water primrose, and cattail.

Related diquat research by James R. Whitley, Missouri Conservation Department, Columbia, showed that Pithophora filamentous algae can be controlled with ½ ppm of the diquat cation.

Public health aspects of aquatic work were discussed by C. Mervin Palmer (left), a health official from Cincinnati and new Society president Charles P. Bolster of Pennsalt, Philadelphia.

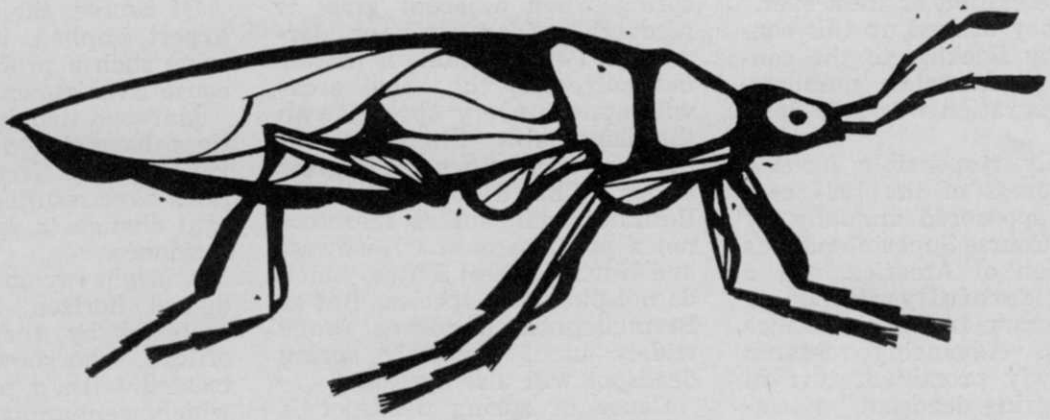
A significant piece of research from the Plantation Field Laboratory, USDA Crops Research Division, in Fort Lauderdale, Fla., shows that Amitrole-T applied to a parent waterhyacinth is translocated through connecting stolons to the offshoot plants. This is something which 2,4-D will not do. Researchers involved in this work are Drs. J. W. Conner (deceased), Lyle W. Weldon, Robert D. Blackburn, and Donald E. Seaman. Work was done in cooperation with the Army Corps of Engineers and Florida Flood Control Districts.

After testing with Amitrole-T, results showed that the greater mobility of this compound accounted for excellent control and less regrowth than when 2,4-D was used. If fenac is added to the Amitrole-T, a faster topkill of waterhyacinths results.

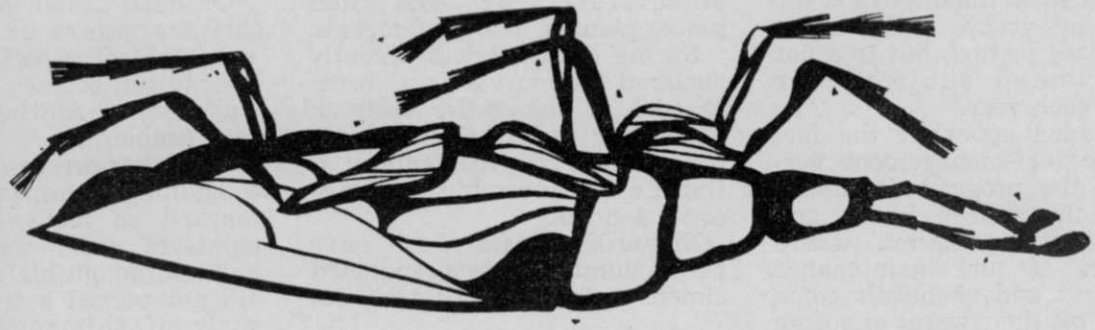
Bolster New President

At the business session of the Aquatic Weed Control Society, presided over by President Henry P. Carsner, Northwest Weed Service, Tacoma, Wash., new officers were elected. New president is Charles P. Bolster, Pennsalt Chemicals Corp., Philadelphia, Pa. First vice-president is Kenneth M. Mackenthun, U. S. Public Health Service, Cincinnati, Ohio. E. Victor Scholl, Modern Weed Control, Grand Rapids, Mich., is the 2nd vice-president. Secretary-treasurer for the group next year is Albert Lopinot, Illinois Department of Conservation, Litchfield.

President Bolster told *Weeds & Turf* that the next meeting of the Aquatic Weed Control Society will be at the LaSalle Hotel in Chicago, Feb. 11-12, 1965.



Here today...



...goner tomorrow

Ethion kills chinch bugs . . . ends destruction to lawns, parks and fairways. Ounce-for-ounce no pesticide outperforms it. Tests show just one application gives outstanding results and provides total control. And Ethion is easy-to-use, safe, economical, long lasting. U.S.D.A.-approved to curb sod webworms, halt mites in Bermuda grass, too. Write or call your supplier today for details.

fmc

TECHNICAL CHEMICALS DEPT., NIAGARA CHEMICALS DIVISION, MIDDLEPORT, NEW YORK

Record Crowd of 2755 Delegates Hails Program, Exhibits at 35th International Turf-Grass Conference, Show Last Month

Delegates to the 35th International Turf-Grass Conference and Show in Philadelphia's Sheraton Hotel Feb. 9-14 hailed the yearly educational meeting and trade exhibit as "best ever."

And they backed up this conviction by flocking to the convention in massive numbers; final registration was 2755 delegates.

Partially responsible for the attractiveness of the 1964 conference, sponsored annually by the Golf Course Superintendent's Association of America, was a program carefully attuned to contemporary turf maintenance problems. Advancing research on a newly prominent turf ill called "spring deadspot," a seminar on turf fertilization by a topflight trio of grass nourishment authorities, and a quick review of turf diseases by eminent scientist Dr. Michael P. Britton, were only a few of the well-chosen topics which filled the educational portion of this year's program.

Of course, in the interest of the sponsoring group, many topics not related to turf, but to other golf-oriented subjects, are offered each year.

An added appeal is the fact that the turf-management portion of the program is solidly backed up with a lavish and dazzling trade exhibit, where suppliers of turf maintenance equipment and chemicals come to show off their wares at a time of heightened customer concern with turf subjects.

This year's trade show was no exception to the generally applied epithet, "The greatest show on turf."

Seek Spring Deadspot Cause

One of the most intriguing addresses in the two half-day sessions devoted to turf technology was an address on spring deadspot by Stan Frederiksen, Distributor Products Manager for Mallinckrodt Chemical Works, St. Louis-based producers of turf fungicides.

Frederiksen, who's Industry Chairman for the 1965 Turf Show, has researched spring deadspot for some time; he delivered his findings in an illustrated lecture which succinctly outlined the definite facts presently known about the ailment.

Spring deadspot is characterized by circular brown areas which do not green up in the spring when adjacent grass is recovering from winter dormancy. Peculiar thing is that, if not corrected, the same areas will appear every spring, with the lamentable difference that the dead regions are apt to grow larger. The disease attacks Bermudagrass, and is therefore not a problem in the Northeast and North Central States, which do not plant this species. But as Bermudagrass becomes more widely used, obviously spring deadspot will also spread.

Cause of spring deadspot is undiagnosed, and actual nature of the deficiency is unknown; it is not known whether insects are responsible, a fungus disease, some incorrection in maintenance, or some completely unknown factor. Besides attacking golf courses, the mysterious lesion has shown up in lush lawns, airport turf areas, and other places planted to Bermudagrass.

Spring deadspot was recently declared the most serious threat to turf in the entire state of Oklahoma (where the state experiment station, incidentally, is frantically researching to discover a cure).

Frederiksen said there have been a number of tests conducted aimed at finding a control, but most such tests, until recently, were inconclusive. Fungicides and insecticides were tried, and at one time dieldrin seemed to be helping.

Aquatic weed control was explained by Amchem's John Gallagher.

Of course, the St. Louis turf expert implied, it's difficult to solve such a problem when the cause is unknown.

Mat- and thatch-removal practices have failed to help, and variations of fertilizer applications have resulted in no significant change in spring deadspot incidence.

A bright ray on this otherwise dismal horizon, however, was sketched by the Mallinckrodt official, who showed tests plots treated with a new compound which went unnamed. Preliminary tests are promising, and when more evidence is gathered, the name of the product, and the results of the test, will be released, Frederiksen told a *Weeds and Turf* reporter in a post-lecture interview.

Discourse on Aquatics

On hand to tell the assembled turf managers about aquatic weed control, especially as it relates to golf courses, was John E. Gallagher of Amchem Products, Inc., Ambler, Pa.

Gallagher presented slides and a running commentary which touched on many of the high points of water weed management, although his allotted time did not permit a truly detailed study of this most complex subject.

The Amchem scientist reviewed several prominent pest weed species, and said that the maintenance of chemically harmless (either to crops or people) water is a moral responsibility of everyone who works in aquatic weed control.

Control of aquatic weeds is a far more extensive activity than most people realize. The U. S. Army Corps of Engineers, for example, spends one million dollars every year to control alligatorweed alone. Alligatorweed is a species quite troublesome in the South.

Equipment was pictured, and such spreaders as the Gandy-type, an agricultural device, was recommended.

Gallagher also said helicop-