

contact and systemic; some weeds are killed faster than others, the most resistant taking up to four weeks. Some emerged species such as arrowhead, burreed, and water-primrose will be killed with Aquathol Plus also. This formulation also leaves a margin of safety for fish.

A much more active aquatic herbicide is formed when endothall is formulated as the amine salt. The products Hydrothol 47 and Hydrothol 191 will control weeds with concentrations of 0.5 to 2.5 ppmw. The amine salts are more toxic to fish also (concentrations of 0.3 ppmw to 1 ppmw may kill them). Partial treatments with this chemical eliminate the danger because fish swim away from treated areas.

Hydrothol 47, at high rates, can be used for pond renovation. Complete kill of weeds and fish is quick and restocking can take place one or two weeks from treatment depending upon the extent of infestation.

Applicators are not expected to pick a single chemical from this partial list to do all jobs. Numerous chemicals are available and all have advantages and disadvantages depending upon what job needs to be done. From job to job, conditions will vary; desires of clients will vary widely also.

Check State Water Laws

Before any chemicals are applied to any waters, operators should seek information concerning state laws with regard to application of herbicides to water bodies. States such as Wisconsin and Minnesota require that an officer of the Water Pollution Board or the Conservation Department be present when chemicals are applied.

Some states simply require a permit, with all pertinent information submitted when the job is to be done. This information usually includes the size and location of the lake, inlets and outlets, the nature of the nuisance, the chemicals which will be applied and their concentrations. These laws make certain that contracting applicators know their business.

In the third and last installment of this series, we shall cover equipment and application techniques used in aquatic weed work. A bibliography is included with the final section, to be published next month.

Know Your Species

SAGO PONDWEED

(*Potamogeton pectinatus*)



Sago pondweed, one of the most costly water infesters, is also one of the most difficult to eradicate of all potamogetons.

Sago pondweed has adapted to many types of water conditions and this influences the losses it can cause. Irrigation ditches in the West are subject to infestation by sago pondweed. This rooted perennial grows so thickly that stands often block flow of water in irrigation ditches and thus damage crops needing water. Sago is the only pondweed that is resistant or tolerant to reasonable amounts of sodium arsenite. For this reason, identification must be accurate.

Sago is a very bushy pondweed with long, rounded, and many-branched stems. Stems are not upright; rather they are limp and bend with currents. Heavy infestations in lakes hinder wave action and contribute to stagnation.

Branching from stems are the slender leaves, distinctive in that they are rounded and threadlike, and taper to a point. In flowing water, groups of leaves are fanlike.

Small flowers are borne atop a spike which protrudes from the water only during blooming. It is an extension of the mainstem and does not arise from the juncture of leaf and stem. Pollen from this flower is carried by wind. The seeds of sago provide excellent duck food; this plant is protected and sometimes propagated on many waterfowl refuges.

Although sago pondweed produces an abundance of flowers with viable seeds, a major means of its spread is by root-runners or rhizomes. These runners give rise to many offshoots over a wide area. Very few plants can thoroughly infest relatively large areas. In summer, some root-runners produce tubers which overwinter and sprout new pondweeds the following spring.

Sodium arsenite, which controls other pondweeds, will not control sago pondweed. Some of the newer aquatic herbicides, such as endothall and Diquat, have proved successful and are being used against this widespread pest. Aromatic solvents and acrolein are used extensively in western irrigation canals and drainage ditches to control this nuisance plant.

Prepared in cooperation with Crops Research Division, Agricultural Research Service, United States Department of Agriculture, Beltsville, Maryland.

Drawing courtesy of the Regents of the University of Wisconsin, from N. C. Fassett, A Manual of Aquatic Plants, 1960, the University of Wisconsin Press.

535 at '63 Wooster Field Day

Updated on Lawns, Ornamentals

"Excessive thatch can 'suffocate' soil... Bentgrass is a weed in some lawns... Lawn weeds are indicators of deeper turf deficiencies."

This is a sampling of information collected by 535 professionals who attended the annual Lawn and Ornamental Field Day at the Ohio Agricultural Experiment Station in Wooster, September 17.

Thirteen stops on the campus tour provided facts from seeds to weeds, diseases, pests, and trees. At each stop, station staffers presented results of tests conducted this year, and answered delegates' questions.

Agronomy professors R. R. Davis and J. L. Parsons showed visitors that the Ag station is keeping up with new problems such as, for example, thatch control and removal. Thatch is defined as "a tightly mingled layer of living and dead stems, leaves, and roots of grasses which develops between the layer of green vegetation and the soil surface." Thatch may become so thick that soil is nearly "suffocated"; water penetration is lessened also with thick thatch.

Station tests on thatch removal showed that removal appears to rejuvenate turf and make it seem like a young stand. Thatch removal gives Merion bluegrass better color and more drought tolerance, according to Dr. Davis' and Dr. Parson's work.

High mowing, heavy fertilization, returning clippings, excess acidity, and clay soil interact to cause thatch. Several thatch-removing machines of tine and knife types were demonstrated.

Soil Grub Controls

"Billbugs are the most dominant turf pest in Ohio," explained entomology professor J. B. Polivka. "Powdery material in grass stem bases indicates that billbugs are working."

"Two and one-half pounds of actual chlordane applied to Merion bluegrass in 1959 is still giving good control of billbugs, web-

worms, cutworms, and earthworms in a treated plot," Dr. Polivka revealed. Control chemicals should be applied before August 15, before grubs begin to go deep in the soil for winter hibernation, the entomologist advised.

"Kelthane, Tedion, or Aramite directed to lower leaf surfaces control spider and red mites on evergreen and deciduous ornamentals," Dr. Ralph B. Neiswander suggested to delegates hearing about ornamental pests. Mites which cause bronzing and stunting of azalea can be controlled with a malathion spray just before new spring growth," he added. Horticulturist Dr. L. C. Chadwick warned that malathion may injure certain juniper species and mottle leaves of roses and sweetgums.

Weeds Are Symptom, Not Cause

"Annual weeds are a symptom of poor turf and not a cause," Dr. E. W. Stroube revealed to a group of notetakers. "Kill weeds as they crop up, but look for a basic cause, such as soil compaction, poor drainage, or improper mowing," he suggested. Silvex and 2,4-D will kill most broadleaved weeds. For tough weeds like knot-

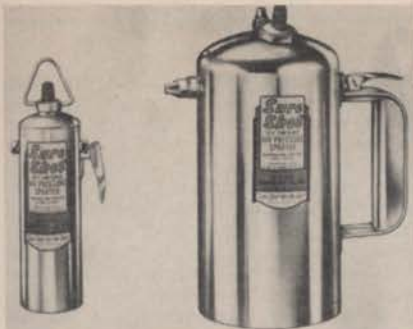
weed and red sorrel, a new product, Banvel D. (dicamba) shows promise. It is not yet labeled for turf use, Dr. Stroube pointed out.

Head agronomist Dr. Richard R. Davis led off the afternoon tours with an explanation of an experiment in selective control of bentgrass in Merion bluegrass. "Yes, bentgrass is a weed, when it begins to take over Merion turf," Dr. Davis asserted. "Responding to inquiries, we have set out to see if we can find controls to keep bentgrass out of bluegrass lawns." The best recommendation supplied by the station expert was 2 summer applications, 4 weeks apart, of silvex at 6 lbs. per acre. Vertical mowing a week before the first treatment helps the silvex action.

Research of agronomist Dr. Glover Triplett will help those in the field of lawn renovation. Dr. Triplett has shown by tests that several chemicals may be superior to mechanical tillage for lawn replacement. Fumigants, such as methyl bromide, may be used in the hands of those with experience, and reseeding can be accomplished in as little as 48 hours. Other chemicals tested were Amitrol-T plus dalapon, which gives a slow kill and a longer waiting period. Amitrol-T alone kills faster but misses some perennials. Paraquat, can be seeded over in 48 hours, but some broadleaves may escape the treatment.



In a previous meeting this year at the Ohio Agricultural Experiment Station, nearly 125 representatives of the agricultural chemicals industry met to examine results of new turf chemicals. Delegates examined test plots like the one shown here, where (left to right) Lee Hedrick, California Chemical Co., Felix Merullo, Merullo Landscape Service of Columbus; and station staffer Dr. R. R. Davis viewed results obtained with the selective grass killer, Paraquat.



Air-charged sprayers from Milwaukee Sprayer Mfg. Co. include the six-ounce capacity Model C (left) and the one-quart capacity Model A. Both units are refillable and reusable, and have all-metal construction.

Model Air-Charged Sprayers

Two new Sure Shot sprayers have been introduced by Milwaukee Sprayer Mfg. Co., both air-pressurized by standard compressed air chuck or auxiliary CO₂ bulbs and hand pumps.

Light liquids can be dispensed in a jet stream up to 20 ft., the firm claims, or in a fine to coarse range of mist sprays for wide area coverage. Accessories include nozzle extensions and pocket spring clips.

For more information on the new sprayers, write to the manufacturer at 2437 W. Fond du Lac Ave., Milwaukee 6, Wis.

Niagara Has Morocide Bulletin

Information on Morocide, a new miticide claimed effective for controlling mites resistant to organophosphate and chlorinated

hydrocarbon pesticides, is available from its manufacturer, Niagara Chemical.

Uses for Morocide, and application instructions for spray and dust, are detailed in the guide, "Morocide For Remarkable Mite Control," available without charge from Niagara Chemical Division, FMC Corp., Middleport, N.Y.

N. C. Entomologist Recommends Precautions for Dormant Oils

Although dormant oils are not nearly so toxic to man as some other insecticides, certain precautions must be followed when applying them to ornamentals, Dr. M. H. Farrier, entomologist at North Carolina State College, Raleigh, advises contract applicators.

Most important, of course, is never to apply dormant oils during the growing season, since they would burn the leaves and possibly kill the plant. Winter oils have more impurities than summer oils, Dr. Farrier points out.

An application just before the buds burst is more effective in killing scales and mites than an application in the fall or winter. Whenever dormant oils are used, spray early in the day, so the spray will be dry before lower night temperatures. Temperature should be above 45° F. when an oil spray is applied, and should not drop below freezing the following night.

Because of likely injury, oil sprays should not be used on sugar or Japanese maples, black or Japanese walnut, butternut, beech, magnolia, and some evergreens, including chamaecyparis, cryptomeria, Douglas fir, true firs, hemlock, and yews.

Never apply the same or two different dormant sprays to the same plants in the same season, Dr. Farrier concludes.

John Bean Describes Catalogs

A variety of catalogs, each covering a different series of products, has been prepared by John Bean Div., FMC Corp., covering its various sprayers, rotomists, pumps, etc. For more information write the firm at P.O. Box 9490, Lansing 9, Mich.

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Horticultural Spraymen's Assn. of Florida Annual Convention, Robert Meyer Motor Inn, Orlando, Oct. 31-Nov. 2.

Annual Washington State Weed Conference, Chinook Hotel, Yakima, Wash., Nov. 4-5.

American Society of Agronomy Annual Meeting, Denver Hilton Hotel, Denver, Colo., Nov. 18-22.

Weed Society of America, Pick-Congress Hotel, Chicago, Ill., Feb. 10-13.

Aquatic Weed Control Society Annual Meeting, Palmer House Hotel, Chicago, Ill., Feb. 11-12.

Approve Ethion for Ornamentals

New registrations for use of ethion on ornamentals have been granted by the U.S. Department of Agriculture, the Niagara Chemical Division, FMC, announced recently. Ethion, which Niagara manufactures, is known to turfmen as a chinch bug killer.

Ethion can now be used to control the two-spotted mite on junipers and yews, tea scale on camellia, and pine needle scale on pines.

Under the new registrations, 1 to 2 qts. of Ethion Superior 60

Second Oil (containing 0.67 lbs. ethion per gallon) are specified per 100 gallons of spray when treating for mites on junipers or yews.

According to the new label claims, applications to curb mites should be made when they first appear, and be repeated as required, while in curbing tea scale, treatment is recommended when crawlers first appear.

For more information on ethion, write Niagara Chemical Div., FMC Corp., 100 Niagara St., Middleport, N.Y.

Trimming

All burned up. Denver, the mountain-top city which boasts a healthful climate, is as weed-ridden as the rest of our communities, judging from a news clipping we just received. Local firemen have even been ordered to strike out after the pest plants with flame throwers! And they have a budget of several thousand dollars to do it with. But the chief, who estimates his costs at \$5 to \$6 per acre, is, we feel, unrealistic with himself. It is doubtful whether such a low fee takes into consideration the labor involved, even if the firemen are getting paid anyway! Besides, it's psychologically unseemly for firemen to be starting fires, we feel, and strongly urge our Denver friends to tell their incendiary fire department that there are other ways!

Korn on the job. In a recent issue of *The Asplundh Tree*, house organ for employees of the Asplundh Companies, we noted the interesting occupation of one Larry Korn, chief pilot for the Jenkintown, Pa., organization. Larry had just flown a group of Asplundh executives down to Petersburg, W. Va., to inspect a line clearing job the company had under way for The Virginia Electric Power Company. Here's a man who's always up in the air about his job, one of our secretaries commented flightily.

Bows for Holley. Scheduled to return this fall from the Union of South Africa is Colorado State University's W. D. Holley, a professor of horticulture who's been teaching South African nurserymen how to grow bigger and better flowers. Bob, as his friends call him, spent the time on the dark continent at the invitation of the Union's Ministry of Agriculture. Carnations are one of the big crops down there, which is right up Bob's alley (he's internationally known for his work with carnations) so we know the Coloradan did a real goodwill job for his school and his country!

Parker to Bartlett. Just learned that former assistant professor of plant physiology at Yale, Dr. Johnson Parker, has been appointed physiologist for the Bartlett Tree Research Laboratories in Stamford, Conn. Dr. Parker will devote his studies to noninfectious tree diseases, which seem to be on the increase. We congratulate this eminent scientist on his new position, and welcome the qualifications which he brings to our industry.

Gamma whammy. It was only last month that we reported, in a jesting mood, that one survivor of nuclear attack would almost assuredly be crabgrass. Now, heaven forbid, we learn that some scientists up at the U. of Mass. in Amherst are bombarding a number of wood-eating insects with gamma rays. Furthermore (hold on to your hats), they find that certain bark-eating insects actually thrive on radiation! Theory behind all this, we discovered later, is that the rays destroyed certain other species, thus reducing competition for survival (which gets tough for us, too, from time to time), and consequently helping the wood-eaters along. Any other uses for this gamma whammy, doctors?

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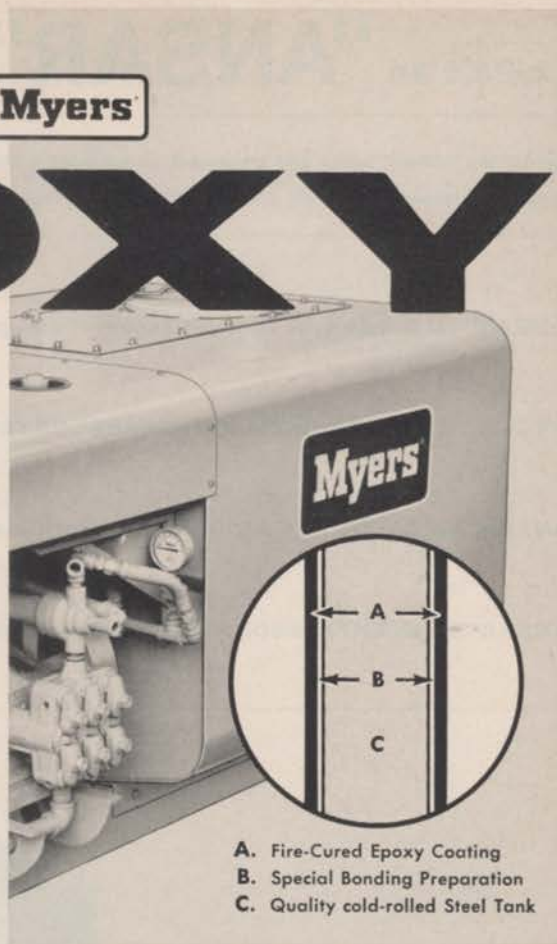
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