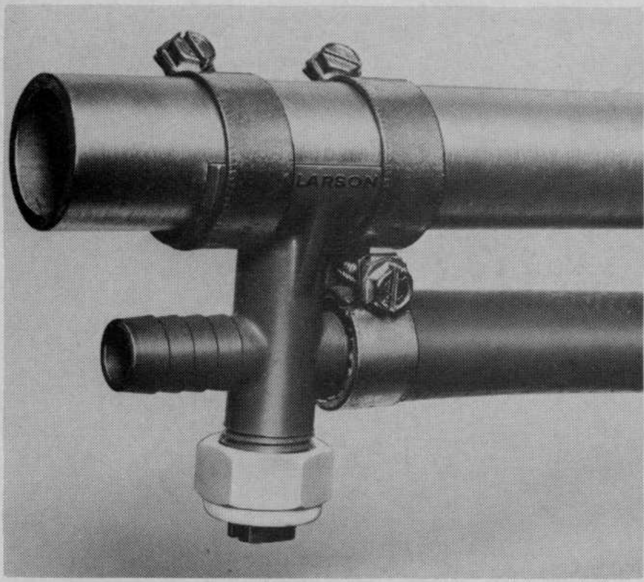
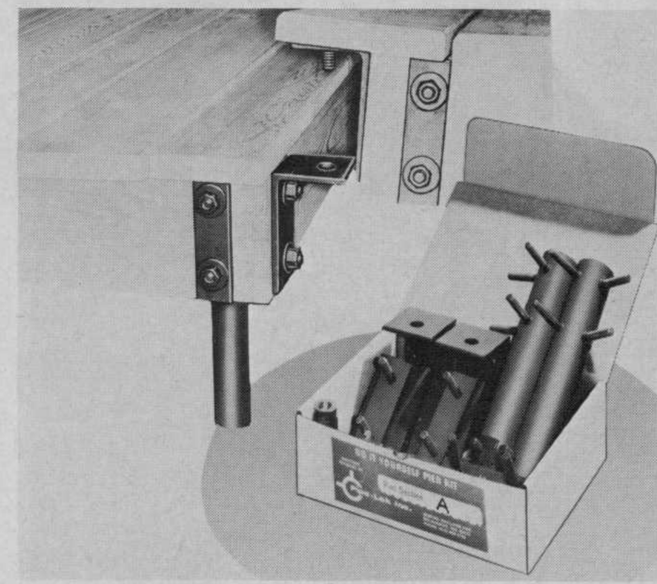


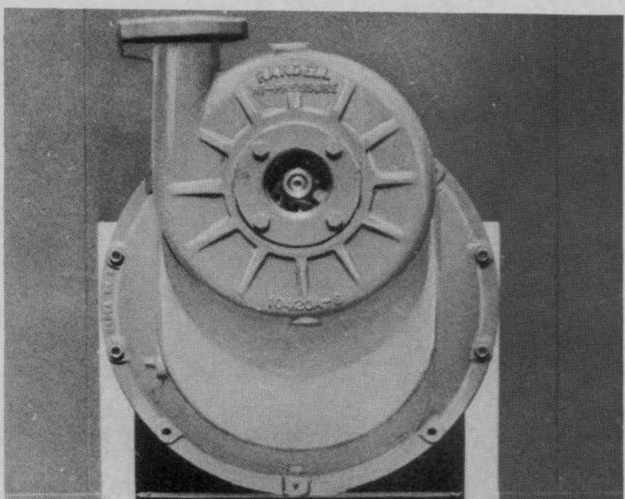
NEW UNI-NOZZLE: Larson Machine, Inc., Princeville, Ill.

Un-Nozzle revolutionizes boom spraying. Handles any chemical or liquid with non-corrosion, rust-proof nozzle. Made of polypropylene fiber-glass. Ultra-light weight giving perfect balance which eliminates spray boom misalignment and twisting. Easy to install, permits variable spacing. Snap on and tighten with hose clamps. Can be positioned in-line, at bottom of spray boom at any side angle or top of boom. Universal for use on any type tip, flood jet, flow regulators, and for drop or KLC. Tee features large ½" spuds. For more details, circle (703) on the reply card.



PIER AND BRIDGE KITS: Pipe-Lok, Inc., Milwaukee, Wis.

Small, utility piers, docks and bridges quickly and permanently assembled with Pipe-Lok Pier and Bridge Kits. Recommended for reasonably shallow and calm water installations and for bridging small streams, ponds and gullies. Includes all locking, securing and bracing hardware needed to assemble heavy duty, 8-12 foot sections, using ordinary tools. User provides wood stringers, decking and inexpensive 1¼" I.D. (1⅝" O.D.) standard galvanized support pipe to suit requirements. Adjustable (10" vertical variance) locking device and supporting hardware bear up to 3000 lbs. of dead weight. For more details, circle (704) on the reply card.



SPRAYMAN'S PUMP: Randell Manufacturing Company, Woodlake, Calif.

Dependable pump for spray equipment is the Randell, custom designed, centrifigal, single stage, high pressure pump. It has a spring loaded seal that requires no packing or lubrication. Bearings are heavy duty, deep groove, precision ball, with built-in seal. Machined and balanced silicon bronze impeller runs on stainless steel shaft. Few moving parts. Control valve, connected with by-pass valve protects the pump and seal from excessive pressure. For more details, circle (707) on the reply card.

INVISIBLE GLOVE CREAM: Ayerst Laboratories, New York City.

Kerodex®, a protective barrier cream, is available in two formulations No. 71, a waterproof cream, to help protect hands against skin irritations that may occur from the use of liquid fertilizers and insecticides and No. 51 to help protect hands against possible harmful effects of dry fertilizers. Both are greaseless and stainless. For more details, circle (708) on the reply card.

"TURFLINE" SPRAYERS, F. E. Myers & Bros. Co., Ashland, Ohio

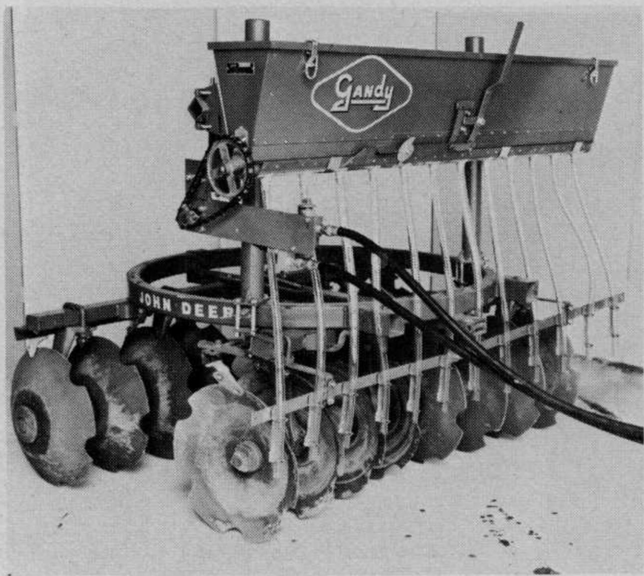
New line of boom and gun power sprayers for weed, fungus, and insect control. Includes sprayers recommended for chemical spraying wherever large areas of turf must be maintained. Also designed for mosquito control, tree and shrub care and right-of-way maintenance. "The Greens Sprayer" (Model # TL10ETMG), to cite one example, features adjustable fast hitch, permitting it to be used with drip-proof diaphragm check nozzles, and folds on arresting hooks for compact storage. For more details, circle (709) on the reply card.

HYDRAULIC SEEDING AND MULCHING MACHINE, Toro Mfg., Minneapolis, Minn.

New line of hydraulic seeding and mulching machines, called EVCO-U (Environmental Control Unit), developed for rapid and efficient seeding, sprigging, mulching, watering, fertilizing and fire-fighting on various types of terrain. Four models — 3000, 1500, 1000 and 500 — gallon working capacity units. Available on tandem axle trailer or skid mount. Handles full acre in single pass. Greater acreage-per-load possible when machine is used for seeding, using only water, seed and fertilizer. All models have four nozzles as standard equipment for close, medium and long-distance spraying and all have hydraulic direct drive. For more details, circle (710) on the reply card.

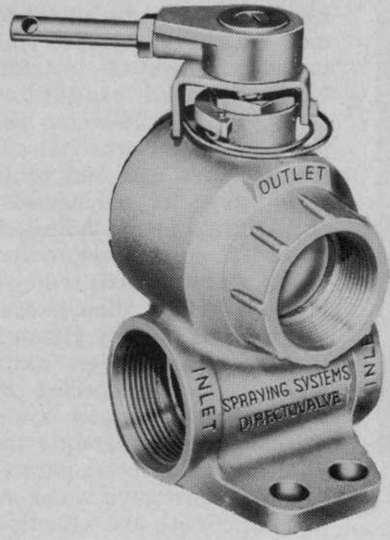
Mini-Sabre Mower, Solo Motors, Newport News, Va.

Sole distributor of Pennsylvania Power Mowers, including Mini-Sabre. Padded seat and seat back. Combination foot clutch-brake conveniently located for easy, speedy use. Will cut ¾ acre per hour. Available with or without electric starter. Four additional models available. For more details, circle (713) on the reply card.



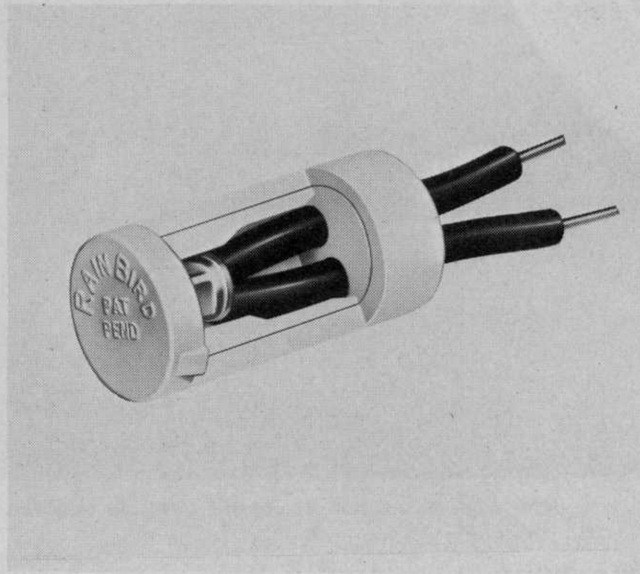
BROADCAST GRANULAR APPLICATOR, Gandy Co., Owatonna, Minn.

Broadcast granular chemical applicators, to be mounted on disk-harrows and other implements, designed for precision applications of herbicides, insecticides, fungicides, nematocides, and other granular materials requiring careful application, especially at low rates. Available in 3, 4, 5, 6, 7, 8, 10, 12, and 14-foot sizes, with a single hopper. Larger wing-type implements up to 24-foot widths can also be equipped with Gandy granular applicators. Plastic drop-tubes deliver granules to near the soil surface, before they are released for incorporation by the implement. Deep, shallow or surface application possible. For more details, circle (714) on the reply card.



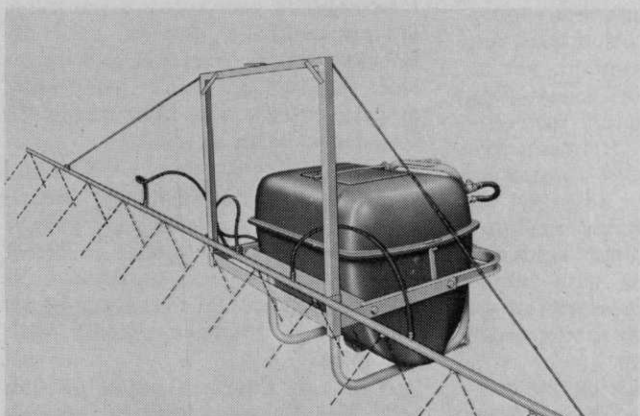
RACHET HANDLE DIRECTOVALVE: Spraying Systems Co., Bellwood, Ill.

New No. 1215OR DirectoValve that indexes in sequence to open or closed position with each movement of the spring loaded ratchet handle is fast and positive. Valve is a ball-type design with continuous flow 1½" NPT (F) inlet connections and 1¼" NPT (F) feed line connection. Made of cast iron or aluminum body with internal operating parts of zinc plated steel and aluminum. Buna O-Rings assure leakproof operation. Vito O-Rings also available. Pressures up to 150 psi . . . and liquid temperatures up to 180° F. For more details, circle (711) on the reply card.



IRRIGATION WIRE CONNECTORS: Rain Bird Sprinkler Mfg. Co., Glendora, Calif.

Rain Bird's Pen-Tite Connectors are specially designed for automatic sprinkler system installations where underground waterproof connections are required. Easy to install, the Pen-Tite connectors have a precision molded PVC socket, sealing plug and crimp sleeve. Exclusive Rain Bird Sealer prevents water and moisture leakage, thus eliminating burn-outs, shorts and voltage drop damage. Comes packaged ten complete units per bag. Simple assembly instructions are included. $4.50 list. For more details, circle (712) on the reply card.



FULL LINE OF FIBERGLAS SPRAYERS: Hart-Carter, Peoria, Ill.

Fiberglas sprayers include 25 models, sizes. Spray booms and spray gun attachments also available. Fiberglas tanks provide long spray life, withstand hard weathering without damage, are lightweight, and corrosion resistant. Choice of 3 or 6 gpm pumps. Saddle tank sprayers fit on tractor or three-point sprayer attach to tractor for use with boom or spray gun. Available in 100 or 150 gallon capacity with choice of 6 or 10 gpm pumps. Engine skid sprayers are self-contained and self-powered. For more details, circle (715) on the reply card.

HYDRAULIC TOOL BROCHURE: Ackley Mfg. Co., Clackamas, Ore.

Hydraulic Powered Chain Saws that operate on hydraulic power sources of either open or closed center types are covered in an illustrated brochure. Chain length options, chain speed data, required hydraulic GPM and pressure and other important buying decision details are included along with accessories such as a fiberglass holster for handy carry and storage. For more details, circle (716) on the reply card.

Most common method of aquatic pesticide application is airboat.

Gallagher *(from page 18)*

Sago pondweed and other potamogeton species still constitute a severe problem in the waters of the western irrigation systems. The partially-satisfactory aromatic solvents with their inherent danger to fish are being used, but search for a better solution continues. New herbicides are constantly being screened and new application techniques have been developed to make the current materials more same. Work pertaining to nutritional requirements for establishment and the physiological aspects of temperature and planting depths is under way on several submersed weed species. Bruns (7) showed that acrolein applied at 0.6 ppmw volatilized as the treated waters moved downstream. Calculated losses were equal to 22% at one mile, 53% at 3 miles and 98% at 19 miles. Weed injury was still occurring at mile 18. Hathrop (8) reported that a low-rate long-contact period of acrolein application had been successful in the Columbia River Basin Project. Concentrations of 0.1 ppmw over a 48-hour period provided excellent control of sago pondweed in canals carrying 300 CFS and in laterals carrying 150 to 300 CFS.

Copper sulfate is being used in a similar manner to control higher plants as well as algae. Bartley (9) controlled both sago and leafy pondweed over several miles of ditch with daily applications of 0.5 ppmw copper sulfate. A 6- to 8-week treatment period was needed to produce the desired effect. Of importance here was the lack of copper build-up in canal-bottom soils. Apparently pondweeds extract copper efficiently from treated water. With a single dump application of 411 lb. in a 411 CFS flow canal (standard algae control rate is 1 lb./CFS) Bruns (7) found that 95% of the copper in 23 miles of canal was sorbed by suspended particles which dropped to the bottom and re-released the copper. No build-up occurred. In neither test were fingerling trout injured.

Riemer (10) partially filled a void in the knowledge of the action of copper in his work dealing with the behavior of copper sulfate in small ponds. He verified the ability of plants to keep the copper suspended when he showed that a heavy bloom of algae reduced the amount of copper in the water. He also showed that larger granules which sink to the pond bottom permit less copper sulfate to get into solution than the theoretical expected amount, yet at the same time that part which goes into solution mixes rapidly throughout the water system. Riemer's hypothesis that the copper applied as large granules may be adsorbed on the bottom muds possibly explains why Ware felt he had achieved more effective control with larger granules. Perhaps concentration at the stem-root zone permitted greater adsorption by the plant.

Much additional work on the control of submersed species is in the literature and more is yet to be reported. This work varies from cultural characteristics of individual species to broad-spectrum response to herbicides. Riemer (11) determined that under New Jersey conditions cabomba *(Cabomba caroliniana)* over-winters primarily as vegetative portions of the plant. No viable seed was produced either in the laboratory or in field experiments. In the laboratory test optimum growth occurred at pH 6.0 in aerated water with low levels of calcium.

In terms of new chemicals or new uses for old chemicals total water treatments of diuron, endothall dihydroxy aluminum salt, Fenac, and dichlobenil control submersed species. Walker (2) reported that diuron in gelatin capsules weighted with sand controlled cladophora and spirogyra in cold-water ponds for three months. Pierce (13) and Hambric (14) had excellent control of a wide range of submersed species with diuron. Pierce indicated that at 0.6 to 1.0 ppm myriophyllum, eleocharis, and acicularis were resistant. Most of the filamentous algae appeared susceptible. Hambric found that 2 lb./surface acre controlled a wide range of species, dispersal throughout the water system was excellent, and apparently there was immediate absorption with resultant kill since extensive water exchange did not reduce the effectiveness of the treatment.

In current Amchem research Fenac applied at the 1 to 5 ppmw needed to provide disappearance information for label purposes controlled many submersed aquatic species, particularly pondweed, and also the fringe growth of cattails *(Typhus* spp.) commonly found around ponds.

Dichlobenil studied more for the control of emersed than for submersed species was applied preemergence to Illinois ponds in December by Hiltebran (15). Rate of 16 to 20 lbs. prevented the growth of *Potamogeton pectinatus;* lower rates did not control *P. foliosis.* Yeo (16) knocked down American and curlyleaf pondweed, small pondweed, elodea, cattail, and cladophora in four weeks with 10 lb./A.

Regarding endothall, Patterson (17) refers to the dihydroxy aluminum salt as a particulate carrier which brings the herbicide in direct contact with aquatic weeds. Cortell (18) confirmed the advantage of its direct and prolonged contact with the plant.

Although this is a paper dealing with aquatic weed control research in the United States, the work of Wile in Ontario and Thomas on Prince Edward Island should be included. In both instances the work was stimulated by use demands. Ontario Water Resources Commission maintains aquatic weed research studies for answering the many requests for assistance in maintaining provincial farmponds and recreation waters. Thomas, Fisheries Research Board of Canada, worked out the details for 2,4-D granular control where eelgrass *(Zostera marina)* had become a severe problem in maritime province oyster beds.

The association of aquatic weeds and high nutrient levels in polluted waters has stimulated interest in that relationship. Investigating the effects of pollution on aquatic growth and development, Denton (19) selected three species: alligatorweed *(Alternanthera philoxeroides)*, parrotfeather *(Myriophyllum brassiliense)*, and water hyacinth *(Eichhornia crassipes)* growing in polluted and unpolluted waters. The plants were analyzed for ash, carbon, nitrogen, phosphorus, calcium, magnesium, potassium, and sodium. Samples of water and bottom muds were analyzed for the same elements. Plant ash varied with water hardness but the carbon content differed little with the environment. Plant nitrogen, magnesium, and sodium varied considerably with the concentration of these elements in the water and bottom soils. Riemer (20) analyzed 30 species of aquatic plants and their surrounding waters, checking 12 chemical elements. The data was recorded but not interpreted. Ryan (21) reported the effects of fertilization on the growth and mineral composition of anacharis, two myriophyllum species, and *Potamogeton* pulcher. In a two-year study the four species showed unlimited consumption of nitrogen, phosphorus and potassium when fertilized. Anacharis and *Potamogeton pulcher* fertilized showed significantly higher yields than in control pools. Unfertilized *Myriophyllum spicatum* produced the greater yield. *Myriophyllum heterophyllum* responded to fertilization in 1967, but not in 1968. This effect of excess nutrients was evident at Ft. Lauderdale where it was found that high levels were toxic to hydrilla.

The current indication is that more work will be done on this aspect, stimulated in part by attempts to utilize aquatic vegetation as a feed supplement, and also the possibility of utilizing aquatic plants to trap excess nutrients in runoff water.

Otto (22) used nitrogen and phosphorous at two enrichment levels but did not increase the total vegetative mass of *Potamogeton nodosus* or *P. pectinatus*. The two species have low nutrient level requirements which are met primarily by the parent vegetative propagule.

Emersed Weed Species

In the United States the most important emersed aquatic weed species are water hyacinth *(Eichhornia crassipes)* and alligatorweed, both serious problems in navigable waters. Research for controlling these weeds is also important because mats of them provide ideal mosquito-breeding conditions. The phenoyx compounds seem to offer the best control, 2,4-D for water hyacinth and 2,4,5-TP (silvex) for alligatorweed.

Among new chemicals, in the water hyacinth work by Weldon and Blackburn (23) 3 lb./A ametryne was very effective. Associated residual studies showed that at that rate ametryne remained in the water in the treated area for 32 days. The problem of drift to susceptible crops precipitated work with ametryne. To avoid the hazard of drift and also of volatility Ball shifted to an oil-soluble amine form of 2,4-D applied through the Microfoil boom for treating hyacinths in the Loxahatchee Reservoir, situated in the center of the vegetable growing area around Lake Okeechobee in Florida.

Alligatorweed is still included in test programs because we do not have a herbicide that is satisfactory in all situations. Weldon and his co-workers (24) found that 5 and 10 lb./A of granular dichlobenil controlled rooted emersed plants, but not floating ones. Spencer (25) reported that 12 lb./A of silvex plus 3 lb. ai of amitrol-T maintained 40% control of alligatorweed after a 12-month period. In an all-out attempt to eradicate alligatorweed in a California test, Pryor (26) achieved complete kill with a drench of 1 qt. of Vampam plus 1 gallon of weed oil in 25 gallons of solution per 100 sq. ft.

Although a few years ago 8 lb./A of 2,4-D seemed to be controlling water chestnut *(Trapa natans)*, resurgent and spreading infestations are now requiring further research. Results of a test program started in 1965 by Steenis and Elser (27) indicate that mixtures of 2,4-D and dicamba applied to immature developing seeds cause these to rot. Seeds treated at maturity are sterilized. Treatments made before flowering had no effect on the seed viability or development.

In the lily family a two-year test program conducted by Weldon and Blackburn (28) showed that 4 lb./A of dichlobenil applied in summer to early fall produced 90% control of fragrant white waterlily *(Nymphaea odorata)* and was more effective than in 8 lb./A rate applied during the winter. Taylor (29) agreed with Weldon and Blackburn on white waterlily, but suggested that 10 lb./A be used for the complete control of spatterdock *(Nuphar advena)*. The best application time in the southeastern states was during the period of active growth. Comes and Marrow (30) recorded 99% control of white waterlily three months after Aril treatment with 7.5 and 15 lb./A of dichlobenil. Riemer (31, 32) investigated the effects on spatterdock of varying frequencies of defoliation, of a combination of defoliation plus 2,4-D, and of the effects of 2,4-D plus ETHREL (2-chloroethylphosphonic acid). He reported that defoliation depleted food reserves, the greater loss being associated with the greater number of prunings. Three trimmings plus 40 lb./A 2,4-D BEE provided complete kill with no regrowth the year following treatment. The addition of ETHREL to 2,4-D as a tank spray mix or as a separate application using 4 lb. of 2,4-D plus 6000 ppm ETHREL provided complete knockdown. A later check of the plot area revealed that the rhizomes from the treated area were unhealthy and spongey-looking, while those from the check plots and 2,4-D along were healthy and sprouting.

Ditchbank Weed Control

Ditchbank weed control retains high research priorities because of the intensity of irrigation and drainage area problems. The USDA-ARS aquatic and noncrop weed control groups are working on the major weed species such as reed canarygrass *(Phalaris arundinacea)*, carax and hardstem bulrush *(Scirpus acutus)*. Much of the work is investigating physiological aspects. The growth habits of problem plants and their place in the succession of vegetation as well as their competitive characteristics are being studied quite intensively. Of particular importance are the ecological studies which show changing weed populations.

Discussing the joint problem of reed canarygrass control and plant succession Hollingsworth and Comes (33) showed that applications repeated up to five times produced better kill of reed canarygrass than single applications of a higher rate. They also reported that amitrol-T was superior to amitrole alone. Plant succession favored establishment of bluegrass and redtop over a naturally-occurring weed mixture. Oliver (34) noted excellent control of annual broadleaf weeds and good grass tolerance with 0.25 lb./A of picloram and with a 1.4 lb./A of fenac on irrigation rights-of-way. The effectiveness of these materials suggested a 2-year weed control period might be possible. Kemper (35) controlled headstem bulrush with treatment rates of 2.2 and 4.4 lb./A methanearsonate. Spring treatments were superior to those in mid-summer and early fall. The spring treatment showed less than 10% regrowth in the second year. McHenry (36) verified Kemper's results but preferred mid-summer application. In McHenry's test, 1 lb./A of DSMA was second to the 2 lb. rate of a low volatile ester of 2,4-D. 2,4-D is an effective treatment, but drift is an inherent danger to susceptible crops.

Herbicide Residues

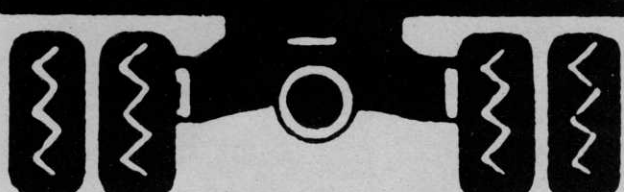
The question of pesticide residues is becoming the most critical aspect of aquatic weed control. With chemical methods the concern is the herbicide itself. With mechanical methods it is the re-release of nutrients into the water, creating more favorable environments for weed re-establishment. We must know the degradation and disappearance time of any herbicide placed in water, and also residues in fish and bottom organisms which make up the biological food chain.

Averitt (37) recorded a decreasing herbicide concentration over a 22-day period when 2,4-D dimethylamine sale was applied to Louisiana waters. Initial concentrations went from 189 and 269 ppm to 19 and 10 ppm. Daly, Funderburk and Lawrence (38) showed a differential disappearance of paraquat, diquat, and 2,4-D BEE applied to Lake Seminole for the control of Eurasian water milfoil. There was only a trace of paraquat and diquat after 24 hours but the 2,4-D formulation lasted through the 7-day sampling period. All materials controlled the weed. Paraquat residue was higher in soil and milfoil than in the water. The 2,4-D formulation prevented reinfestation for a much longer time. This data in part verifies the earlier work of Frank (39) who found that 1.33 ppm initial concentration in a still pond was reduced to 0.019 in 19 days and 0.001 ppm ibn 36 days.

The USDA-ARS group is most active in this aspect of aquatic weed work, having endothall, dichlobenil, 2,4-D, amitrole, TCA, ametryne and acrolein under test either as direct application to water or as indirect application associated with ditchbank spraying. Dyes have been used to study channelling as well as stratification of substances introduced in to canal waters. The dilution factor is of most concern in moving waters. Dyes have also been used by Steenis and others in determining flow currents associated with using diquat and 2,4-D amine salts in back coves of Chesapeake Bay tidal flats.

Sheer volume is a major problem with mechanical harvesting of aquatic weeds.

The second aspect of herbicide residues associated with aquatic weed control pertains to those waters used for crop irrigation. Two USDA facilities, both in the Western Irrigation Region, are studying the effects on crops of known quantities of herbicides applied in fixed volumes of irrigation through both sprinkler and furrow methods. The crops being studied represent the crop grouping established by the U. S. Food and Drug Administration and include sugar beets, beans, corn, wheat, and potatoes. These experiments are generally carried through to yield to determine cumulative ef-



fects as well as immediate formative effects. At the present time acrolein, silvex, 2,4-D, fenac, amitrol-T, picloram, and pyriclor have been tested either by Bruns at Prosser, Washington or by Hodgeson at Bozeman, Montana.

Biocontrol of Aquatics

Because of the lack of specialists, it appears that aquatic weed research people are having to wear several hats.

In line with this philosophy is the biocontrol work under way at the USDA station at Ft. Lauderdale, Florida with snails; a tilapia study in California; and a manatee and beetle program in Florida.

Reviewing the animals which were under study as aquatic phytophagous agents Butler (40) referred to insects, molluscs, fish, ducks, and manatees.

Florida is "where the action is" at the present time. In this state the snail, the flea beetle, and the manatee have been utilized to control submersed weeds and alligatorweed. Blackburn and Andres (41) indicate that the snail *Marisa cornvarietis* L. is quite hardy, surviving in a temperature range of 48 to 100° F, can live in polluted waters, and can tolerate a salinity of 2500 ppm. The snail feeds quite actively and is indiscriminate in its eating habits. This is an advantage in that it will keep all vegetation down. Marisa also feeds on disease-bearing snails without transmitting diseases harmful to man, an additional benefit. The disadvantage is that marisa could feed on aquatic crops, such as rice, waterchestnut, and watercress. Perhaps the greatest problem will be producing enough snails to be of value in the area where they will adapt. Field tests show that fairly high populations are needed—8000 per acre stocked in Florida cleaned up ponds and kept them clean over a two-year period.

The so-called mighty mite of biocontrol is the flea bettle *(Agasicles* n. sp) with its single-minded food habit. It apparently lives only on alligatorweed. This insect, imported through the USDA-ARS Entomological Department from Argentina, has been released in the United States at several locations. Zeiger (42) reported successful introduction to Florida waters. He indicates the two characteristics needed—survival and rapid adaptation — were met with apparent satisfactory control of alligatorweed. Blackburn and Andres suggest that the beetle might not be the final answer since it does not prove effective in the Savannah, Georgia, program.

Mechanical Weed Control

The primary objection to mechanical control in the past has been the fact that the methods used frequently spread species which propagate vegetatively. The early collection and compressing of weed masses also returned the nutrients to the water, ultimately supporting a greater weed population. This is apparently changing. Bryant (43) discussed a new and more efficient harvester system which transports the weed mass to the shore and hauls it away. He also noted that a Wisconsin state law now requires weed removal in any weed-cutting operation. The Water Witch uses high pressure to blast weeds from swimming areas, but makes no provision for weed collection and site removal.

Conclusion

To sum it all up, one must say that there is a tremendous amount of aquatic weed research under way. More importantly, understanding of aquatic weed control is progressing to the point of our realizing the necessity of a total environment concept. Research is no longer a shotgun or hit-or-miss concept involved with only a single aspect of the problem. The realization that our natural resources will not last forever at the rate we are using or destroying them is making us all conscious of the need to act as part of a total environment rather than for individual needs alone.

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(Continued on page 49)

Three States Approve Cutrine Label For Turf and Ornamentals

The departments of agriculture of California, Texas and Florida have added the following to the registered label of cutrine sold in those states:

> "For non-crop uses in (state): Water from treated lakes or ponds may be used to irrigate turf, fairways, putting greens and ornamental plants."

Cutrine, a copper algaecide, has gained widespread popularity since it was introduced nationally a year ago. It is registered by the USDA for use in ponds and lakes. Subsequent tests have shown that water treated with cutrine, and then used to water golf greens, fairways and other turf grass areas, will not cause burning or other damage.

"There has been a concern, particularly on the part of golf course superintendents, that once they treat their water with cutrine they will not be able to use that water for irrigation," stated Dennis L. Vedder, Director of Technical Services for Applied Biochemists, Inc., Milwaukee, manufacturer of cutrine.

"Tests have proven differently," Vedder said. "But our current USDA registration does not include use on land or land crops. Thus we have gone to the individual states with our data. On reviewing the data, all three states we have contacted thus far have agreed to extend our registered usage."

One of the significant tests was conducted by John Holloway, Spring Valley Chemical Co., Grove City, Ohio. He used three to six feet diameter test plots, applying one-half gallon of cutrine to each test plot. He applied the material diluted 18:1, 9:1, 3:1 and full strength. In every case, there was no damage to the grasses of the test plot.

Paul Kerr of Dublin, Ohio, veteran golf course designer and operator, had similar success. He treated areas of fairway, fringe and green at his Twin Oaks Golf Club with concentrations of cutrine up to 100 times what is recommended for normal control of algae. There was no damage to the grasses. Kerr even noted that the treated area appeared greener than surrounding areas, possibly the result of a micronutrient value of the copper.

Kerr also treated the lake on the course with cutrine for algae. He continued to water his greens for three weeks (approximately 15 waterings) with the water from the lake. Again, no damage whatsoever.

Consumers will be made aware of the extended usage by means of stickers, outlining the non-crop uses and affixed to all cutrine containers sold in the three states.

Occidental Chemical Named Marketing Agent For Cutrine

Occidental Chemical Co., Houston, Tex., has been named major U.S. marketing agent for cutrine, an algaecide manufactured by Applied Biochemists, Inc., Milwaukee, Wis.

Applied Biochemists' President, Donald E. Seymour, explained that Occidental would sell in the agricultural, industrial, municipal and political agency markets in all but 17 Northeastern states East of the Mississippi River. Applied Biochemists will continue to service the foregoing states and the lake association, commercial sprayer, real estate development and water speciality markets throughout the country.

Occidental has named Charles Nelson as product manager for the product.

SOD
INDUSTRY
SECTION

Sod Pricing Policy

Chief Industry Need

Sod growers have consistently been unable to establish firm prices for their product. In a relatively new industry, there is always the threat of price cutting in the face of any reduced demand, or in instances when there seems to be a greater supply than necessary for immediate market demands.

Henry W. Indyk, executive secretary for the American Sod Producers Association, in a recent statement to members, discussed the slow-down in the economy and a resultant reduced demand for sod in many areas. Price cutting has resulted. This trend, Indyk said, should be of considerable concern to the sod industry, particularly when cost of production is steadily increasing. Indyk points to the experience of other agricultural commodity producers when they were panicked into price cutting.

A basic problem in pricing, he further stated, is that many sod producers do not know their actual costs of production. This stems many times for having less than adequate cost accounting procedures. In order to manage a profitable sod enterprise, Indyk believes complete and accurate knowledge of all costs of production is vital in establishing a price. Because of this important relationship of cost accounting, he said, the ASPA is in the process of developing of cost accounting procedures for ASPA members.

Key questions for a producer to conside.·, Indyk stated, are: (1) Will the price be above or below actual cost of production; and (2) How much of an increase in volume of sales will be necessary at a reduced price to realize the same net return at the old price?

To partially answer this second question, Indyk recently sent grower members some data accumulated by Donald D. Juchartz, a Michigan State University county Extension Director. Juchartz has long worked with Michigan sod producers.

His data show that a 20% price cut (from 33¢ to 27¢ or from 5¢ to 4¢) means that a 400% increase in volume is necessary to make the same profit obtained before the price was lowered. The following table will serve as a guide for price changes:

Henry W. Indyk

Price Cut	Necessary Increase in Sales
3%	13.6%
5%	25.0%
7¼%	42.8%
10%	67.0%
15%	150.0%
20%	400.0%

The following table shows what (values are approximate) happens when the process is reversed or prices increased:

A 3% increase means the same profit on 90.0% of the same volume.

A 5% increase means the same profit on 83.5% of the same volume.

A 7¼% increase means the same profit on 77.0% of the same volume.

A 10% increase means the same profit on 70.5% of the same volume.

A 15% increase means the same profit on 64.5% of the same volume.

A 20% increase means the same profit on 57.5% of the same volume.

However, Indyk in his report also pointed out to member growers that certain developments in the economy point to a bright future. He listed: (1) Healthy advances in retail trade; (2) Upsurge in the stock market; (3) Availability of money at lower interest rates; (4) Building boom in housing; (5) Slow-down in inflation; and (6) An easing of war tensions.

These are healthy signs, Indyk believes, and should be reflected in the sod industry. Furthermore, he said, sod is a product that plays a significant role in the improvement of the environment. He pointed out the effectiveness of sod in preserving open space and the contribution it can make toward relieving some of the growing national concern about environmental improvement.

Best Commercial Display Won By Nunes Turfgrass

Nunes Turfgrass Nurseries, Inc., of Patterson, Calif., won the top award for a commercial display at the Seventh Annual Turfgrass Exposition sponsored by the Northern California Turfgrass Council.

At the Santa Clara County Fairgrounds, site of the show, the exposition honored Nunes not only for design of its booth but also for its imaginative display of products. A total of 158 exhibitors competed.

Credit for the display, according to President John F. Nunes, goes to Joe Ventura, Nunes sales representative.

John Nunes has long been active in the sod industry and is well known among growers for his Nunes sod harvester. He has been a consistent exhibitor at every field day of the American Sod Producers Association.