



# Aquatics

SEPTEMBER 1982

## FLORIDA AQUATIC PLANT MANAGEMENT SOCIETY — 1982

### President

Bill Maier  
3315 Whirlaway Trail  
Tallahassee, FL 32308  
904-893-3571

### President-Elect

Carlton Layne  
217 Bolender Court  
Auburndale, FL 33823  
813-683-9767

### Treasurer

Jim McGehee  
P.O. Box 212  
McClenny, FL 32063  
904-791-2218

### Secretary

Bill Moore  
210 Valencia Shores Dr.  
Winter Garden,  
Florida 32787  
305-656-5838

Editor of Aquatics / Paul Myers / 310 Thelma Street / Lake Alfred, Florida 33850 / 813-533-1205

Debbie Valin  
820 E. Robson Street  
Lakeland, FL 33805  
813-688-3754

### DIRECTORS AT-LARGE

Andy Price  
P.O. Drawer D  
Plant City, FL 33566  
813-752-1177

Elroy Timmer  
320 S. State Rd. 7  
Suite 4  
Plantation, FL 33317  
305-792-1500

Herb Cummings  
South Florida W.M.D.  
9001 N.W. 58th Street  
Miami, FL 33178  
305-592-5680

Nick Sassic  
Orange County  
2008 E. Michigan Ave.  
Orlando, FL 32806  
305-420-3102

Ross Hooks  
2020 Wilton Drive  
Wilton Manors  
Florida 33320  
305-563-0808 ext. 243

Ray Spinnock  
10307 S. Indian River Dr.  
Port St. Lucie  
Florida 33452  
305-878-8990

Len Bartos  
461 Rogers Avenue  
Brooksville, FL 33512  
904-796-7211

Rue Hestand  
P.O. Box 1903  
Eustis, FL 32726  
904-357-6631

Joe Joyce  
2832 Arapahoe Ave.  
Jacksonville, FL 33402  
904-791-2215

### COMMITTEE CHAIRMEN

#### Governmental Affairs

Frank Wilson  
P.O. Box 39  
Bartow, FL 33830  
813-533-1205

#### By-Laws

Terry Shersperson  
9001 N.W. 58th Street  
Miami, FL 33178  
305-592-5680

#### Program

Mike Mahler  
3033 Huntingwoods Blvd.  
Tallahassee, FL 32303  
904-386-8697

#### Local Arrangements

David Tarver  
2416 McWest Street  
Tallahassee, FL 32301  
904-386-8533

#### Awards

Jim Wilmoth  
Rt. 1, Box 963  
Palatka, FL 32077  
904-328-8321

#### Advertising / Editor

Joe Flanagan  
Rte. 3 Box 64  
Live Oak, FL 32060  
904-362-1001

#### Membership & Publicity

Carlton Layne  
217 Bolender Court  
Auburndale, FL 33823  
813-967-7374

#### Nominating

Clarke Hudson  
8212 Sugarbush Ct.  
Orlando, FL 32811  
305-351-3295

#### Special Funding

Elroy Timmer  
320 S. State Rd. 7, Suite 4  
Plantation, Florida 33317  
305-792-1500

# Heavy Weed Growth Ahead...



# Clean, Open Water Behind

## That's how it is when the HARVESTER makes its pass

You are looking at the most positive, most economical, cleanest method of aquatic weed control yet devised. Strong statement? We believe we can back it up.

**POSITIVE** — No need to wait days, or even hours to assess results. The HARVESTER reaches down, cuts and removes weeds *right now* — surely and efficiently as a combine gathers grain.

**ECONOMICAL** — Independent studies show that when it comes to the bottom line, you can't beat aquatic weed harvesting in the cost of work completed. Studies are available on request.

**CLEAN** — If water is clean enough for swimming before the HARVESTER makes its pass, it's clean enough for swimming in its wake.

**LET US TELL YOU MORE** — This HARVESTER is just one of many machines and systems pioneered by AQUAMARINE for effective waterweed control. Our track record shows every piece of equipment still in service. Let us help you select or design a system for you.

# AQUAMARINE

**AQUAMARINE CORPORATION**  
Subsidiary of DredgeMasters International  
P.O. Box 616, 225 North Grand Avenue  
Waukesha, WI 53187 • 414/547-0211

## Combee Airboats Inc.



Full line of aluminum and fiberglass Airboats and Service  
All sizes and types of airboats to meet your needs.

### Combee Airboat Engine Options:

Aircraft power plants  
Automotive power plants  
High performance automotive belt drive power plants

### Full Service Repairs:

Complete engine repairs by A&P certified mechanics  
Aircraft to automotive change-overs  
Complete metal work  
Modification and repair to existing metal work  
Stainless steel tank fabrication  
Authorized Sensenich propeller dealer

Combee Airboats would like to make available to you our 19 years of experience in the manufacturing and service of airboats

Call or write today for additional information:

**COMBEE AIRBOATS INC.**  
1210 33rd ST. N.W.  
WINTER HAVEN, FL 33880  
PHONE (813) 293-1917



---

## EDITORIAL

### THE CHEMICAL AQUATIC WEED CONTROL PROGRAM

Recent scrutiny, either justified or unjustified, of numerous pesticides should enlighten the aquatic manager as to possible happenings in the near future.

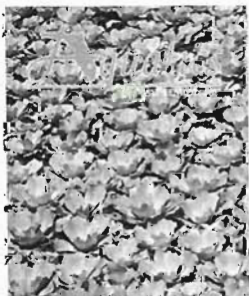
Chemical aquatic weed control programs in Florida have come into being as a result of the need for control. The use of herbicides has both economic and efficacious appeal.

Research and new technology aimed at improving herbicide efficacy while reducing the quantity used is to be applauded. Likewise, recognition and establishment of maintenance control programs have further reduced herbicide usage, water hyacinth being the prime example. Hydrilla, the number one aquatic plant problem, continues to invade new water bodies. We learned that hydrilla has benefits in terms of fish management and water clarity. Eradication philosophies have turned to management philosophies.

Biocontrols and mechanical controls are being utilized throughout the state to varying degrees. Their expanded use seems eminent, not as a result of anti-pesticide sentiment but rather due to their own merits.

Aquatic herbicides are a very necessary and valuable tool in managing aquatic plants. The data generated to provide assurances of their safety in water has cost millions, if not billions, of dollars. Understanding the aquatic environment and utilizing the proper management tools to achieve the desired results are goals of the competent aquatic plant manager.

PAUL C. MYERS



**THE COVER**  
*Pistia Stratiotes L.*

# Aquatics

SEPTEMBER 1982/VOLUME 4, NO. 3



---

## CONTENTS

Water-Lettuce <i>Pistia Stratiotes L.</i> by Marc C. Bruner .....	4
Public Funded Aquatic Plant Control Operations in Florida by J. Michael Dupes and Michael J. Mahler .....	6
Plant Management in Farm Ponds by Joe Hinkle .....	8
Aqua-Vine .....	15
CAST (Council for Agricultural Science and Technology) .....	18

---

## CALENDAR NOTES

FLORIDA AQUATIC PLANT MANAGEMENT SOCIETY  
ANNUAL MEETING / OCTOBER 27-29, ORLANDO

---

The Florida Aquatic Plant Management Society, Inc., has not tested any of the products advertised in this publication nor has it verified any of the statements made in any of the advertisements. The Society does not warrant, expressly or implied, the fitness of any product advertised or the suitability of any advice or statements contained herein.

---

©1982 FAPMS, INC. All rights reserved. Reproduction in whole or in part without permission is prohibited.

---

The Aqua-Vine Section of "Aquatics" has been added to provide information on current events and recent publications from industry and government to increase the dissemination of aquatic plant control techniques and regulatory changes. Complete copies of reports mentioned in this section can be obtained on request to the respective authors or the Editor of "Aquatics."

---

AQUATICS: Published quarterly as the official publication of the Florida Aquatic Plant Management Society. This publication is intended to keep all interests informed on matters as they relate to aquatic plant management, particularly in Florida.

---

CORRESPONDENCE: Address all correspondence regarding editorial matter to Paul C. Myers, Editor, "AQUATICS" Magazine, 310 E. Thelma St., Lake Alfred, FL 33850.

# Water-Lettuce

## *Pistia Stratiotes* L.

by  
Marc C. Bruner

Ecologist  
USDA/ARS Aquatic Plant  
Management Lab  
3205 S.W. 70th Avenue  
Fort Lauderdale, FL 33314

Water-lettuce (*Pistia stratiotes* L.) is not a major aquatic weed in Florida or other areas of the United States although it can occasionally become a problem. Here and worldwide, the floating species water-hyacinth and salvinia, and various submersed species receive more attention. But water-lettuce is a component of our aquatic ecosystem, and is common enough to have appeared on the cover of *Aquatics* at least three times. The biology and management of this species has been studied by aquatic plant biologists, and these studies allow an assessment to be made of the problems and potential of water-lettuce.

Identification of water-lettuce, also known as *Pistia*, is not difficult. Anyone who has experienced the problems of identifying watermilfoils or potamogeton can appreciate that fact. This species, the only one in its genus, was first described by Linnaeus in 1753. A member of the Arum family, this monocot shares the aquatic habitat with several other genera in the same family although no others have a free floating life form. Water-lettuce has been recognized, identified and utilized (as an herbal medicine) since the time of ancient Egypt.

The leaves of *Pistia* grow in a rosette, resembling a head of lettuce. The growth form is dependent on population density. Plants in tightly packed mats have many leaves growing almost vertically, while uncrowded plants have a much flatter and spread-out appearance. The yellow to gray-green leaves are covered with a dense layer of hairs. This pubescence creates a water repellent layer which helps keep the plant from being wetted, keeping it upright and afloat in heavy rainstorms. The spongy texture of the leaves is due to aerenchyma. This is tissue composed of large thin-walled cells filled with gases. The stem from which the leaves arise extends a short distance below the water surface. The

A dense mat of water-lettuce can completely cover a body of water, as shown in this canal near Clewiston, Florida.

roots originate from this portion of the stem. These roots are unbranched and fibrous and can reach significant lengths. They are the site of nutrient absorption.

The flowering structures are small and inconspicuous, with both male and female flowers occurring on the same plant in the hollows of the leaves. The size of the whole flower structure is less than 2 inches long. Several male flowers are borne on a thick fleshy stalk above a single female flower. Seed production has not been observed in Florida. Experimental work has indicated that where seeds are produced, they can tolerate cold temperatures and drought, and may be important in long term survival and re-establishment after removal of mature plants. The primary means of reproduction in water-lettuce is the formation of daughter plants as buds or on stolons arising from the parent plant. This growth form leads to the formation of mats of plants, which can be the source of management problems.

The distribution of this species is mainly tropical, with some extensions into sub-tropical regions. *Pistia* is found throughout the tropics with the exception of some of the Pacific Islands. The center of this distribution is uncertain due to man's role in disseminating the plant. The tropics experience most of the problems associated with nuisance growth. In the United States the plant is found through the Gulf States, with additional reports from Arizona. Water-lettuce was most likely introduced to North America for use as an ornamental.

A series of problems is associated with undesired growth of *Pistia*. The reproduction of the plant by stolons leads to the formation of dense mats. These mats can become extensive. In still or slowly flowing water, like that found in the large tropical reservoirs, or sluggish canals in subtropical or tropical regions floating islands can form, hindering navigation. Plant mats covering canal surfaces may impede water flow



A water-lettuce plant with a daughter plant arising from a stolon.

for flood control or irrigation. Water loss from a mat of actively transpiring *Pistia* may be great enough to reduce water levels. These mats or islands can also have a marked effect on water quality, with research results indicating lower light penetration, dissolved oxygen and pH under dense water-lettuce mats. This may adversely affect fisheries.

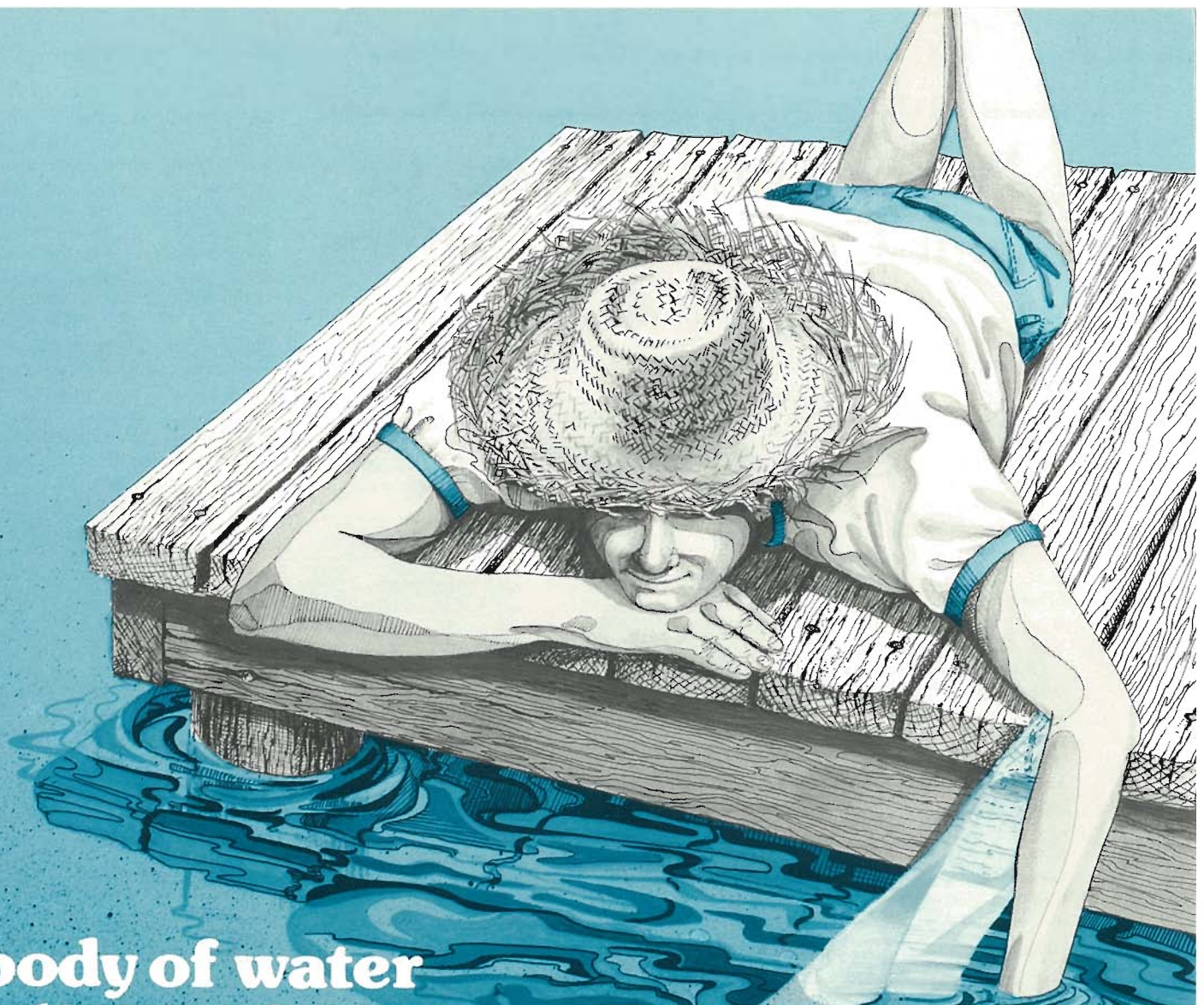
A potentially serious problem is the association of several species of mosquitoes. Two genera of mosquitoes (*Mansonia* and *Coquillettidia*) are known to utilize water-lettuce as a host plant. These associations are so close that aquatic plants are essential for the life cycle of the insects. In several areas in Florida, the mosquito problems associated with aquatic plants have been severe. Reducing or eliminating *Pistia* and other aquatic plants controls the mosquitoes.

The management of water-lettuce, like most aquatic weeds, relies on mechanical, chemical and biological control methods. Mechanical control is often limited, with most management resulting from manual removal. The reason for this is that many of the areas with problems with water-lettuce are in the Third World, with relatively abundant and inexpensive manpower and little or no money to invest in mechanical harvesters.

Chemical control of water-lettuce is effective. Diquat is commonly utilized and its efficacy against this plant has been known since the early 1960's. Treatment rates of 1.0 to 1.5 pounds per acre have proved satisfactory. Paraquat at 0.18 pounds per acre and aqueous ammonia at 44 pounds per acre were used to control *Pistia* in fishponds in India. These treatments were more economical than the usual methods of manual removal used in that location. The extent to which chemical control technology is applied may sometimes be small due to the limited extent of nuisance water-lettuce growth in areas where chemical control is a common approach.

Biological control with herbivorous insects appears to hold great potential. Worldwide at least 23 species of insects have been reported to be associated

Continued on page 14



## A body of water is a living thing...

A delicate balance of plant and animal life. A varied assortment of creatures, many too tiny to see. A place to make peace with the world, and enjoy the wonders of nature.

But all this can change quickly. A slight shift in the environment and a tiny group of plants may suddenly burst into a teeming mass of choking weeds and slime. The effect is dramatic, as fish and other life forms struggle for survival in this hostile new world.

How to deal with these troublesome intruders? How to be sure that the delicate creatures already there may continue their existence unaffected?

The choice is Pennwalt Aquatic Herbicides. To quickly restore the natural balance. Without harming wildlife. Or human visitors.

AQUATHOL® K Aquatic Herbicide

AQUATHOL® Granular Aquatic Herbicide

HYDROTHOL® 191 Aquatic Algicide and Herbicide

HYDROTHOL® 191 Granular Aquatic Algicide and Herbicide

Liquid and granular formulations to control water weeds and algae on contact. And each is biodegradable.

Pennwalt Aquatics. Because an environment so precious should be treated with respect and care. After all, it's a living thing.

AGCHEM

 **PENNWALT**  
CHEMICALS ■ EQUIPMENT

# Public Funded Aquatic Plant Control Operations in Florida

by  
J. Michael Dupes and Michael J. Mahler

In the State of Florida the majority of aquatic plant control operations are funded under two separate programs. One program is funded by the Federal Government and administered by the U.S. Army Corps of Engineers. The other program is funded by the State and is administered by the Department of Natural Resources.

Under the Federal program, control operations are performed under two authorizations. One is the Removal of Aquatic Growth Project (RAGP) authorized by the River and Harbors Act as amended on 3 March 1905. The other is the Aquatic Plant Control Program (APCP) authorized by Section 302 of Public Law 89-298 dated October 1965. The RAGP is funded 100 percent by the Federal Government and is the original operation and maintenance program for

Table 1. Acres of vegetation treated under the cooperative Corps and state programs during fiscal year 1981

Watershed	Floating	Hydrilla	Minor Plants	Total
St. Johns River	8,819	359	265	9,443
Withlacoochee River	983	3,659	393	5,035
Kissimmee River	5,053	1,391	223	6,667
Oklawaha River	1,734	1,894	30	3,658
Lake Okeechobee	760	24	—	784
Alafia-Manatee	224	—	—	224
Lake Istokpoga	1,587	710	—	2,297
Suwannee-Santa Fe	970	214	43	1,227
Peace River	1,970	195	7	2,172
Hillsborough River	376	—	4	380
Myakka River	250	1,130	—	1,380
Gulf Coast	511	1,743	—	2,254
East Coast	—	—	—	—
Aucilla-Wacissa	175	46	2	223
Ocklockonee River	1,856	57	390	2,303
Apalachicola River	240	—	141	381
Northwest Area	4	—	24	28
Caloosahatchee River	2,749	218	35	3,002
Nassau River	53	—	80	133
Lake Trafford	6	224	—	230
<b>TOTAL</b>	<b>28,320</b>	<b>11,864</b>	<b>1,637</b>	<b>41,821</b>

the control of aquatic vegetation in Federal navigation projects. The APCP is a cooperative program for the control of aquatic vegetation in other public navigable water bodies not included in the RAGP. This program is funded 70 percent by the Corps and 30 percent by the state or local governments.

The majority of actual control operations are handled under contract with the Florida Department of Natural Resources, which in turn has sub-contracted with five water management districts and seven counties. In-house operations by the Corps take place only in the St. Johns River between Jacksonville and Lake Washington.

The major problem plants controlled are water hyacinths and hydrilla. Other plant species (minor plants) may also be controlled when the need is justified. During Fiscal Year 1981 (October 1980 through September 1981), 28,320 acres of floating plants (hyacinths and water lettuce), 11,864 acres of hydrilla, and 1,637 acres of minor plants were controlled. Acreage figures of FY-81 are broken down by watershed and shown on Table 1.

Total cost for the RAGP during FY-81 was \$2,039,347. The total cost for the APCP during the same year was \$2,436,593. Local sponsors provided \$730,978 of the total APCP expenditure.

The Florida Department of Natural Resources administers the State Aquatic Plant Control Funding Program as outlined in Chapter 16c-15 F.A.C. This program differs from the Corps of Engineers Funding Program in that the control operations in the State Program are mainly conducted for the purpose of flood control in canals by cities, counties, and special districts. The plants eligible for treatment under this program are ditchbank, floating, emergent, and submergent species. The acreages reported controlled under this program are broken down into these categories.

Representative species of the different categories are:

1. Ditchbank — grasses, Brazilian pepper, Australian pine, cattails.
2. Floating — water hyacinth, water lettuce, duckweed, azolla, algae.
3. Emergent — spatterdock, water lillies, alligatorweed, pickerelweed.
4. Submergent — hydrilla, naiad, algae, pondweed, bladderwort.

These plants were controlled by chemical and mechanical methods. During the reporting period (October 1980 through September 1981), the total cost of operations for the 58 cooperators under this program was \$7,060,898.78. The percentage of state reimbursement for Fiscal Year 1981 was approximately 25 percent, or a reimbursement of \$1,837,861.

Under this program 56,480 acres of plants were controlled with 46% being ditchbank species (26,317 acres); 29% floating (16,137 acres); 10% emergent

Continued on page 14

WATER  
MANAGEMENT  
EXPERTS  
Recommend

**CUTRINE-PLUS**

**BEST ALGAE & HYDRILLA CONTROL!**

CUTRINE-PLUS, available in either liquid or granular, is tops for use in potable water reservoirs; lakes; farm, fish, fire and residential ponds; fish hatcheries; irrigation conveyance systems. This largest selling algaecide in liquid form **effectively controls** filamentous (pond scum, "moss") and planktonic (pea soup) algae. The granular is specially formulated to control chara, nitella and bottom growths of filamentous algae.

For HYDRILLA Control, CUTRINE-PLUS mixed with Diquat provides consistent results every time. CUTRINE-PLUS is **less corrosive . . . less cost per acre . . . Immediate water use** after treatment!



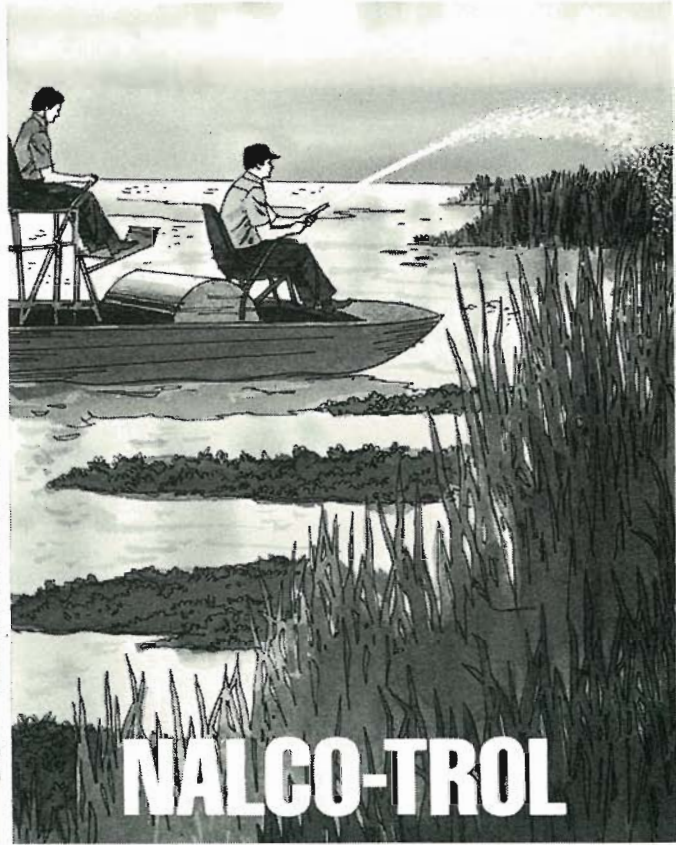
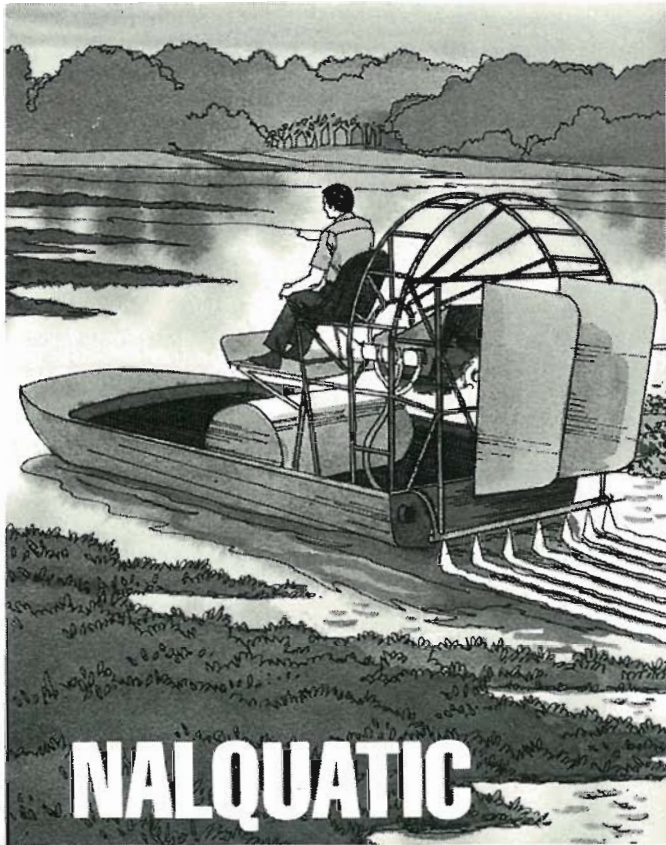
For Complete Information  
Call or Write:



**applied  
biochemists inc**

**TONY KIMBALL  
3348 Waverly Dock Rd.  
Jacksonville, FL. 32217  
904: 268-3727**

# GOOD NEWS FOR AQUATIC WEED FIGHTERS:



## DUAL HERBICIDE APPLICATION TOOLS THAT WORK

Nalco-Trol® and Nalquatic® are good news for the aquatic weed control specialist. Bad news for troublesome aquatic weeds like hyacinth and hydrilla.

When applying herbicide to terrestrial or floating weeds, Nalco-Trol drift retardant and deposition aid delivers more herbicide to the treatment area—better deposition and coverage, minimum drift. For submerged weeds, new Nalquatic

aquatic herbicide carrier puts the herbicide on the weed surface and sticks it there for maximum contact effect.

Nalco-Trol and Nalquatic—the most effective herbicide application tools the professional aquatic weed control specialist can use. Both can be applied with all types of aerial or surface equipment. Get complete details and use directions by requesting our free Nalco-Trol and Nalquatic product bulletins.

Ag Products Div.: Regional Office  
Route 3, Box 1328-E  
Old Lake Unity Road  
Leesburg, Fla. 32748



# Plant Management in Farm Ponds

by  
Joe Hinkle

Regional Biologist

Fla. Dept. of Natural Resources

Bureau of Aquatic Plant

Research & Control

## I. Introduction

In North Florida, considerable recreational and agricultural benefits are provided to the landowner by farm ponds. The majority of these ponds are utilized to produce fish while also providing benefits, such as crop irrigation, livestock watering or providing a convenient "swimming hole." A typical farm pond is less than ten acres, either artificially created or a natural cypress pond, and is usually stocked with largemouth bass, bluegill and redear sunfish. Some of the very small ponds (less than one acre) are stocked with a single species, such as channel catfish or hybrid bream,

which are artificially fed. The best fish production is obtained in ponds which have water temperatures above 65F, a pH from 6.5 to 9.0, high fertility and a heavy planktonic algal bloom (a secchi disc reading of 18-24 inches). Additional fish production can be obtained by artificial feeding.

One of the most common and frustrating problems to the Florida farm pond owner is excessive growth of undesirable aquatic vegetation and filamentous algae. Some aquatic vegetation is valuable and desirable in fish ponds, acting as a buffer to changes in water quality, decreasing turbidity as well as providing protection for fish and a substrate for small food organisms.

## II. Preventative Measures

Although herbicides and mechanical control can provide a good short term solution to a weed problem, the best aquatic plant management strategy is to discourage the plants from becoming a nuisance by proper location, design and construction of the pond. The pond should be built in the shape of a rectangle with the long axis directed with the prevailing winds. This orientation will not only help aerate the pond but discourage floating plants such as duckweed from becoming a problem. Similar problems with floating plants can occur if the pond

is located where trees or the lay of the land block wind action on the water. To avoid vegetation problems along the edge of a pond the sides should drop off sharply to a minimum of two feet; preferably three feet. Existing ponds which have weed problems can be deepened in many cases to alleviate shoreline vegetation problems. Woody vegetation and brush should be removed from the bottom and brush and trees removed from the side for a minimum distance of 20 feet to prevent shading and to reduce the introduction of organic matter into the pond. Centipede grass planted along the edge will prevent erosion and discourage establishment of troublesome aquatic grasses such as torpedograss.

Areas which have excessive water flow such as small streams or springs do not usually make good locations for ponds. High water flows decrease the effectiveness of fertilization programs and herbicide treatments and increase the cost of management techniques. A pond may also receive an excessive flow due to an exceedingly large watershed for the size of the pond. A general rule-of-thumb is about 10 to 20 acres of watershed per acre of pond.

The capability to drawdown the water in a pond is a very desirable feature to include in construction. In many cases successive winter drawdowns have the capability to control most of the submerged aquatics and also avoid the use of expensive herbicides. Normally, summer drawdowns, or drawdown of ponds which do not have the capability of being dewatered to a minimum two-thirds of their normal level, should be avoided. An outflow system which allows water to be removed from the bottom of the pond rather than near the surface is advisable because this removes the less oxygenated water and organic matter from the bottom, leaving the planktonic algal food source near the surface.

One means of discouraging troublesome aquatic plants and filamentous algae is through a good fertilization program. Fertilization produces a planktonic algal bloom which shades-out submersed aquatic plants. This program is usually begun in North Florida around February or March when the water reaches 65F. An inorganic fertilizer such as 8-8-2 is normally required to increase the water fertility enough to support a good plankton bloom. A secchi disc reading of 18-24 inches is a good indication that a proper bloom has been obtained. The pH of the pond should be checked before fertilization to determine if lime is required. If the pH is below 6.5, agricultural lime can be utilized to correct the acidity problem. Lime is usually applied throughout the pond in the fall because it normally takes three to four months before a significant quantity goes into solution, thus making it available at the same time as fertilization. The pond bottom should be limed at

Continued on page 13

## ALGAE PROBLEMS?

CITCO COPPER SULFATE can be the clear solution to rid your farm ponds of the mess and toxic substances produced by algae. And a simple early spring and late fall treatment with CITCO COPPER SULFATE can help the flow of your sewers and drainfields by preventing harmful root encroachment. Does not harm active septic systems. Registered with EPA for both algae and root control, CITCO COPPER SULFATE treated water is safe for drinking, livestock, fish, and swimming without a waiting period when used as directed. Now available in 4 lb. bags. CITCO COPPER SULFATE—THE CLEAR SOLUTION! Contact your dealer, distributor, or:



CITIES SERVICE COMPANY  
**INDUSTRIAL CHEMICALS DIVISION**

P.O. Box 105062, Atlanta, Georgia 30348  
Telephone (404) 261-9100

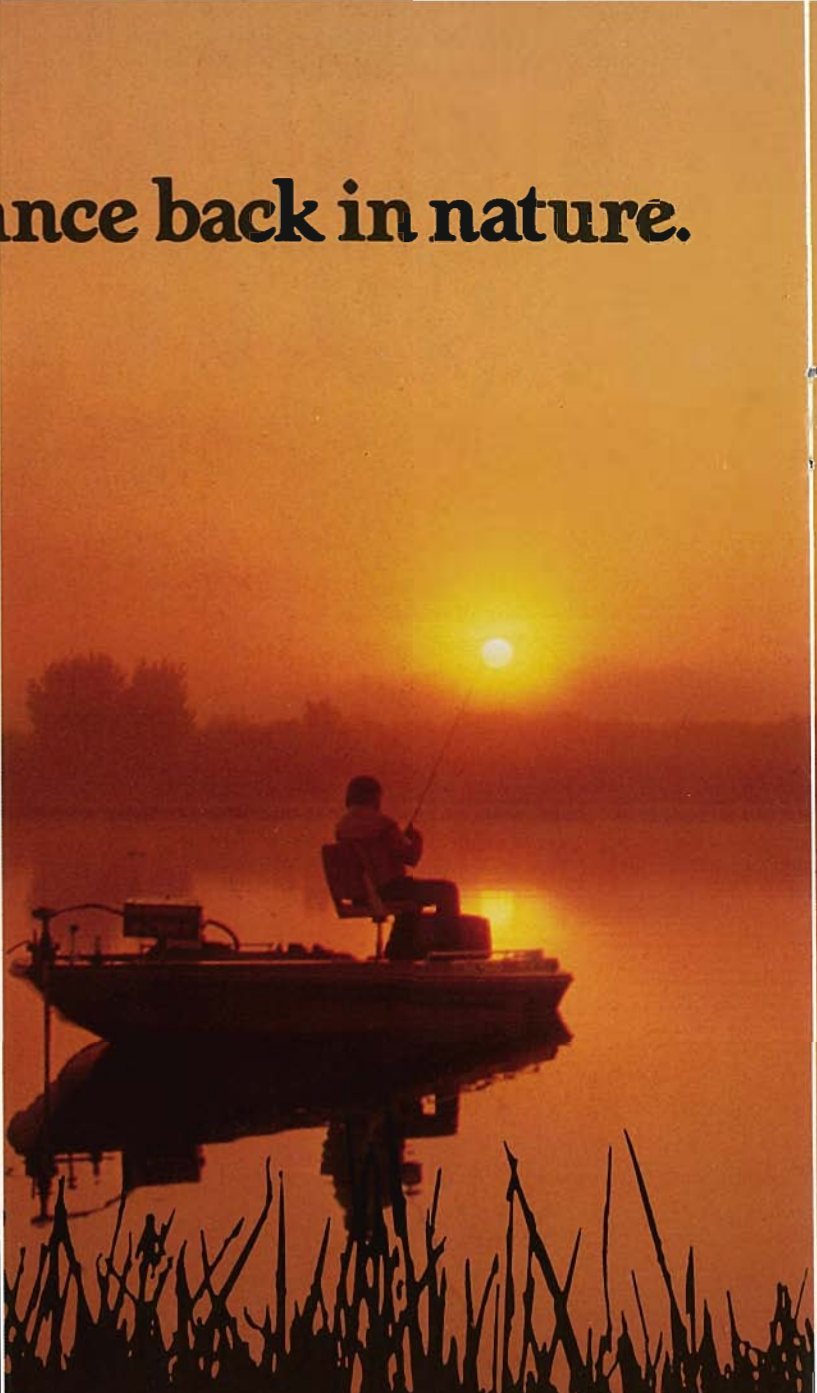


# AQUATIC HERBICIDE BREAKTHROUGH



Sonar EPA Experimental Use Permit No. 1471-EUP-67

# Sonar<sup>®</sup> gently puts the balance back in nature.



Spring

At last there's a new generation aquatic herbicide that manages a host of undesirable vascular plants without mismanaging the good life. Sonar<sup>®</sup> from Elanco.

## Weed management.

One treatment of Sonar provides control during

the critical growing season of many submersed and emersed aquatic weeds.

Weeds controlled include hydrilla, elodea, water milfoil, pond weeds, torpedograss, paragrass, southern naiad and numerous other troublemakers.



Hydrilla



Elodea



Water milfoil



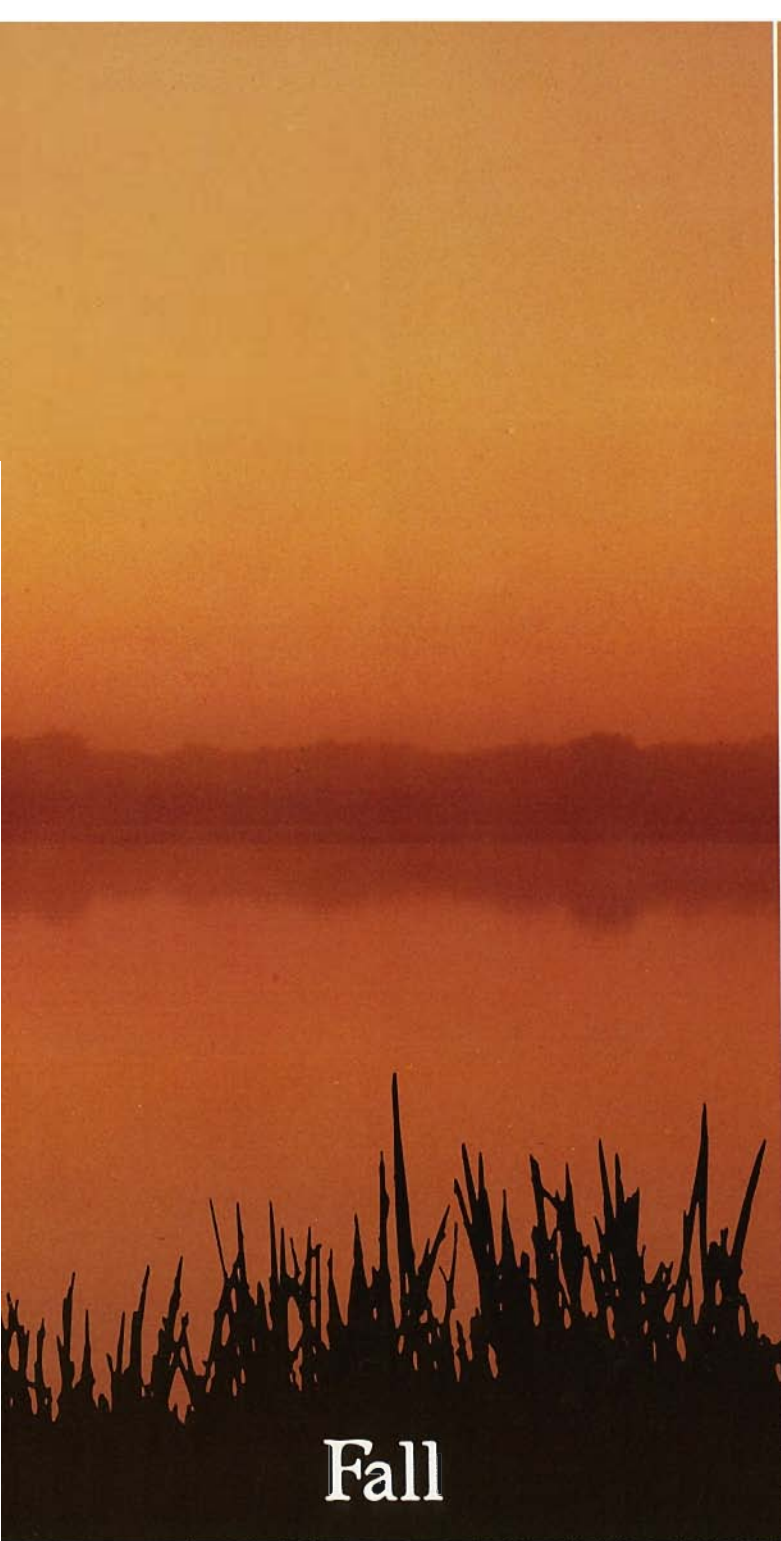
Summer

When you make Sonar part of your weed control program, you get effective management of your valuable water resources.

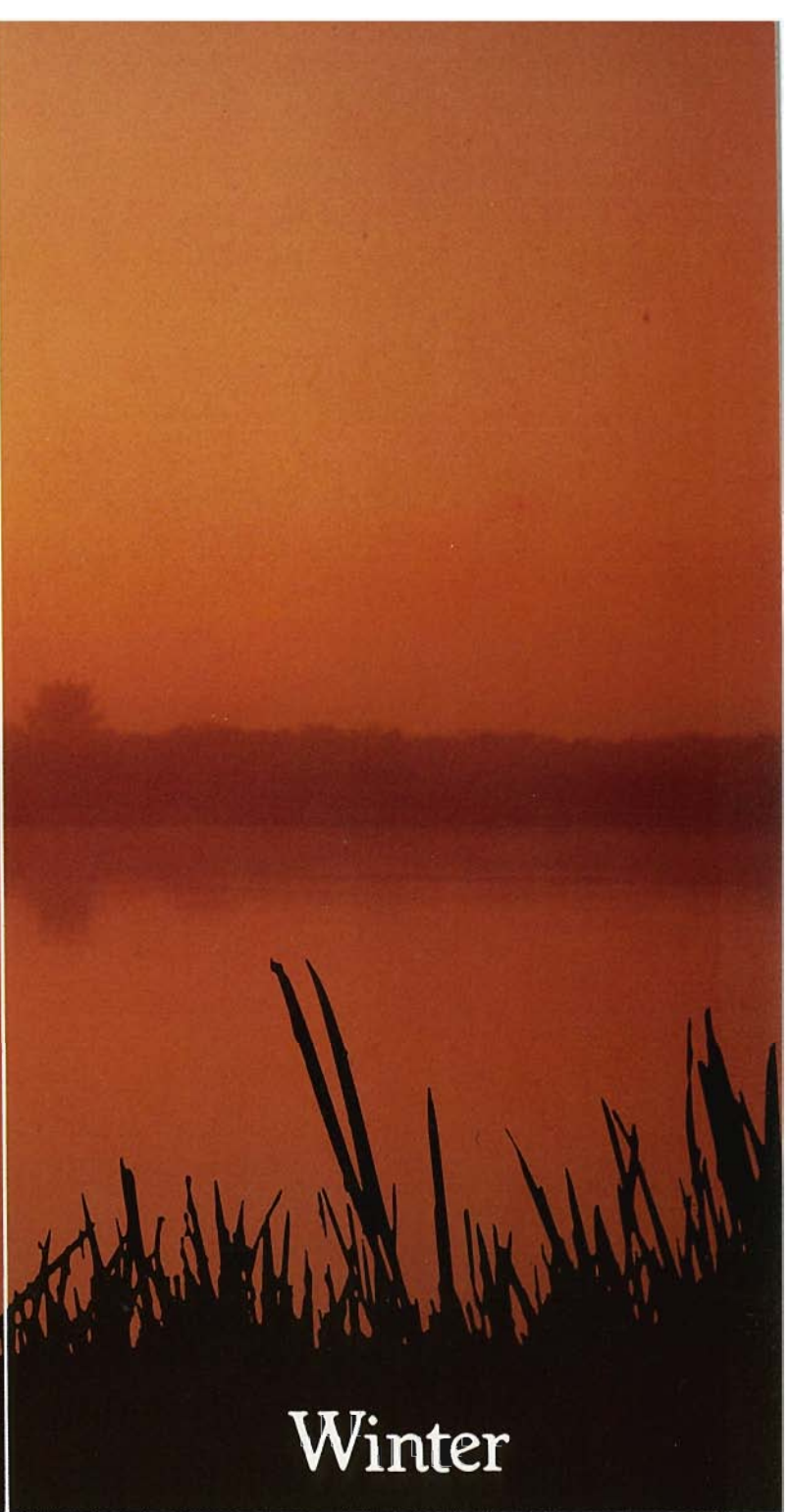
## Slow but sure action.

Four to six weeks after

treatment, Sonar takes its toll on undesirable vegetation. And because of its slow action, there is no rapid oxygen depletion. This makes Sonar highly compatible with the aquatic environment and makes fish kills a thing of the past. Applied as directed, Sonar will not harm fish,



Fall



Winter

wildlife, or nearby trees and shrubs.

### Flexible application.

Sonar can be applied to the entire surface of a pond or up to ten percent of larger bodies of water. Depending on existing



Pond weeds

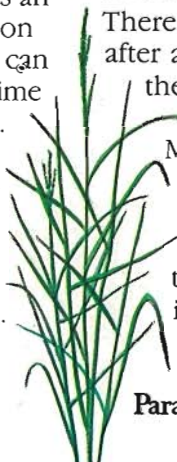
equipment and user preference, Sonar is available as an aqueous suspension or 5% pellet and can be applied any time during the year. For best results, the label recommends applying Sonar when weeds are actively growing.



Torpedograss

### Inherent value.

There are few restrictions after application, and they are detailed on the product label. Make Sonar part of your management program. It's the simple, gentle way to put nature back in balance.



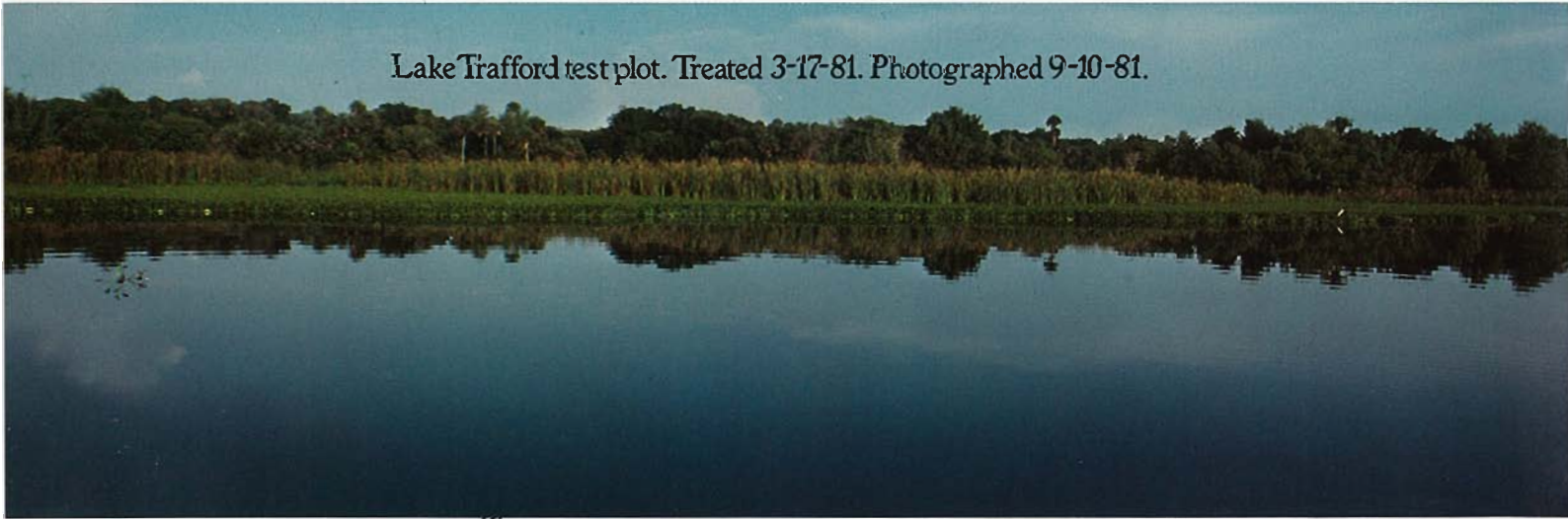
Paragrass



Lake Trafford untreated area.



Lake Trafford test plot. Treated 3-17-81. Photographed 9-10-81.



Sonar<sup>®</sup> aqueous suspension can be applied to the water surface or under the water surface or placed along the bottom of the water just above the hydrosol. Any conventional application equipment can be used.

Sonar 5% pellet can be applied to the water surface from the shore or from a boat. Refer to the Sonar label for complete application instructions.

Always follow label directions. Sonar is available in limited quantities under EPA Experimental Use Permit No. 1471-EUP-67.

For further information write or phone:

David P. Tarver, Aquatic Specialist, 2416 McWest Street, Tallahassee, FL 32303 (904) 386-8533



A typical sheltered pond which has already developed a healthy duckweed growth due to the restriction of wind and wave action.

Plant Management continued from page 8

a rate of about one ton of agricultural lime per acre. Agricultural lime can also be used to decrease toxicity of copper based herbicides.

When utilizing fertilization as a means of aquatic plant management, two important points should be kept in mind:

(1) Once started, a program of fertilization must be carried out on a regular basis or it will cause more problems than before.

(2) Troublesome aquatic plants and filamentous algae must be removed before the program is started, or the plants will increase their densities due to the added nutrients.

Another important factor in preventing aquatic vegetation problems is controlling the introduction of plants into the pond. Non-native (exotic) plants such as hydrilla, water hyacinth, alligator-weed and Eurasian watermilfoil should never be introduced into a pond because they can easily become a severe problem. These exotic plants are not subject to the normal checks and balances as those of native species and as a result are able to dominate the pond, upsetting the entire system. Hydrilla, one of the most



common introduced plants, can thrive under lower nutrient concentrations and lower light levels and has a higher growth capacity than native plants. If you allow neighbors and friends to utilize your pond, make sure they do not introduce into the pond vegetation on boat trailers, in minnow buckets or by fish from another lake (this is also a bad fish management practice). In both public and private waters, the spread of plant problems from one body of water to another is the direct effect of not removing vegetation from trailers, boats, motors, fishing plugs or anything else that will allow the plant to be transported to a new lake.

### III. Common Plant Problems

If you have a weed problem, the first step is to identify the plant that is causing the problem. The easiest method of accomplishing this is to consult one of the DNR regional biologists or the Botany Department of a nearby college. Although there are many species of plants present in Florida ponds, very few are a nuisance.

In the Suwannee River Watershed, the most common floating plant problem is water hyacinth, with duckweed a close second. Many of these hyacinth infested ponds were controlled under the old Corps of Engineers eradication program, but with cessation of this program, hyacinths have gradually recurred as a problem. Duckweed problems commonly occur where there is a blockage of normal wind and water action due either to bank vegetation or pond location.

The most common algal problems (often described as "pond scum") are usually filamentous algae such as *Spirogyra* or *Pithophora*. Filamentous algal problems are in many instances the result of organic enrichment from sources such as agricultural runoff, livestock, ducks, geese, septic tanks or from a sporadic fisheries fertilization program. A fertilization program for weed control and fish production has to be carried out on a regular basis. An improperly conducted fertilization program wastes money, and time and increases weed problems.

The most common nuisance emerged plant problems include the various water-lilies: American lotus, fragrant water-lily, spatterdock and watershield. The majority of these occur in old natural cypress and buttonbush ponds which have fluctuating water levels. Occasionally problems with alligator-weed, water primrose and frog's-bit occur. In very shallow ponds, members of the sedge family, such as hairgrass (*Eleo-*

Continued on page 16

**THE PERFECT INVERT OIL**

- places herbicide on target
- has a consistent invert
- economical 1-2 gal. per surface acre
- ready to use — no diesel oil needed
- no xylene-like additives
- best oil with Minnesota-Wanner equip.
- pleasant citrus odor

There is only one invert oil that fits this description:

**I'VOD<sup>®</sup> INVERT OIL**

Why don't you call us today for a field demonstration:  
**(305) 562-0555**

**JLB International Chemical, Inc.**  
P.O. Box 6006, Vero Beach  
Florida 32960

Water-Lettuce continued from page 4

with, and feed on water-lettuce. In the United States, a moth, *Samea multiplialis* feeds on Pistia. The role of the moth in controlling the growth and spread of water-lettuce in the U.S. has not been rigorously studied, but it has been reported that control can be very effective at certain times. This insect is not host-specific, and feeds on at least four other species of aquatic plants. A weevil has also been found in South America, which appears to be host-specific for water-lettuce. A number of potential insect agents have been found in the Far East.

Like many species that cause problems as weeds, there has been interest in utilizing the growth of this plant in a managed system. Water-lettuce has been investigated for its potential as animal fodder, and appears to be as good a source of feed as any one of a number of other aquatic plants, and perhaps better than water-hyacinth as hog feed. While this use may not be of major interest in developed countries, it may be of value for Third World countries where manual removal may be a significant weed control technology and less money is available for investment in animal feed.

There is a serious effort underway to tap the energy embodied in aquatic plants as a fuel source. Methane generation is a common approach, and studies of biomass conversion often include

water-lettuce. Although it is not as productive as some other species, the quality of biomass produced by water-lettuce favors a rapid rate of methane production. Biomass production using aquatic plants may be combined with a sewage treatment process, in which the plants are used to remove nutrients from the effluent as a biological filter.

Water-lettuce is an aquatic plant with both positive and negative potential. As management of water-hyacinth improves, water-lettuce may become more common and more of a problem. If this happens, the possibilities for both chemical and biological control of water-lettuce are good. As integration of aquatic plant management and the technology of utilization improve, water-lettuce may prove to be an asset in some situations.



Public Funded Operations continued from page 6

(5,651 acres); and 15% submergent (8,375 acres). Chemical control accounted for 85% (47,995 acres) of the control operations. The types and amounts of herbicides used in both programs are shown on Table 2.

The combined acreage of aquatic vegetation controlled in both the Federal

Table 2.

Chemicals Used	Federal Program	State Program
2,4-D	15,189	19,928
Diquat	13,867	10,195
Copper	24,840	16,973
Hydrothol 191	6,601	753
Hydroul*	5,100	15,750
System L		863
Invert Oils	16,958	6,380
Diesel	3,913	4,172
Aquathol K	19,381	6,731
Polymers		3,866
2,4-D granular*		8,590
Banvel 720		6,084
Dalapon*		157,113
Roundup		5,307
Diuron*		21,250
Casoron*		6,550
Velpar		482
Dilimonene		6,185
Aquazine*		235
Hydrothol 191 granular*		1,400
Asulox		70
CuSO <sub>4</sub> *		15,024
Ammate*		90

Note: Amounts of herbicides with asterik are in pounds, all others are in gallons

and State programs during FY-81 totals 71,984 acres. Since ditchbank work is primarily terrestrial, it is not included in this total. This acreage figure represents only 2.6 percent of Florida's 2.8 million acres of fresh water. The actual cost for the combined programs for FY-81 was \$11.5 million. This includes administration costs, personnel salaries and benefits, equipment rental, as well as herbicide costs. Aquatic herbicide costs were approximately \$3.2 million. An additional \$700,000 was spent on chemicals for ditchbank work which were not applied directly to the water.

The acreage and cost figures presented here represent only the work performed under the Federal and State programs. They do not include work performed in other public waters by the private sector or work performed by the small agencies not participating in either program. Therefore, the amount of vegetation controlled and total cost for aquatic plant control operations in Florida will be somewhat higher. There has been much speculation about the extent of aquatic plant control operations in Florida, with some estimates as high as 40 percent of the total fresh water acreage in the state being treated. Cost estimates have been quoted to be \$35 million.

In conclusion, aquatic herbicides utilized in public waters are labeled by the Environmental Protective Agency, and as such have cleared a stringent toxicity and environmental impact screening process to insure the safety of their use in public waters when properly applied. Based on this fact and the information presented above, it is felt that much of the recent concern over the perceived magnitude of aquatic plant control operations in terms of acreage treated, dollars expended, and quantity of herbicides used is unjustified.

## AQUATIC WEED CONTROL



**SPECIALIST IN CONTROL OF HYACINTHS, HYDRILLA AND OTHER AQUATICS**

1. Microfoil boom for low drift liquid applications.
2. Specially designed mechanical slinger for application of dry chemicals and pellets.

OVER 20 YEARS EXPERIENCE IN CONTROL OF FLORIDA AQUATIC PLANTS THROUGH USE OF HELICOPTERS AND AIRBOATS



**STAR AVIATION, INC.**

Associate of Orlando Helicopter Airways, Inc.  
P.O. Box 2802, Orlando, FL 32802  
305-323-1756 — 841-3480

## Center for Aquatic Weed Research

Dr. Arnett Mace has recently stepped down as director of the Center for Aquatic Weed Research at the University of Florida. Dr. Mace was appointed as director approximately three years ago when he joined the University faculty as dean for the School of Forestry and Conservation. Dr. William Haller has been appointed as interim director until such time that a screening committee can review all applicants and make a recommendation on a permanent appointment.

Dr. Mace will remain as chairperson of the Aquatic Plant Advisory Council, a role in which he has been very active. The Florida Aquatic Plant Management Society expresses its appreciation to Dr. Arnett Mace for his efforts and contributions to aquatic plant research and the development of the University's Center for Aquatic Weed Research.

## Aquatic Plant Advisory Council

The Department of Natural Resources has selected Mr. Paul Myers as their appointed representative to the Aquatic Plant Advisory Council. Paul will succeed Mr. Harold Brown who recently resigned from the Council after two years of service. Harold was elected by fellow council members as chairperson during its first year. Harold's personal effort and interest in the establishment of this council were vital to its success and recognition.

Paul's willingness to accept this extremely important role will undoubtedly benefit the aquatic plant management program.

## AQUA-VINE



### *Applicator of the Year Award*

#### Solicitation for Nominations

For the third consecutive year, FAPMS will present the "Applicator of the Year" award to the most deserving spray crew chief and assistant. Two plaques will be awarded at the FAPMS annual meeting in Orlando as tokens of the society's appreciation for the contributions of these people to aquatic plant management.

Honoring the people who exemplify what our society stands for is one of our most important annual functions. The awards committee chairman, and his committee members, would like this to be the most competitive selection for this award to date. We know that the talent is out there. All we need is lots of nominations — please join in and help us.

The selection process will proceed as follows. We would like to receive letters of nomination from supervisors of all federal, state, local and private agencies who are aware of deserving applicators.

Nominations do not have to be by supervisory personnel. We will accept nominations from any society member who feels they know a deserving nominee. In your nomination, please specifically address the following questions:

1. Does the nominee receive any complaints from home owners, etc. with respect to his routine weed control operations?
2. Does the nominee receive any special compliments from home owners, etc. with respect to his routine weed control operations?
3. Does the nominee work in any particularly sensitive areas, i.e., environmentally sensitive, politically sensitive, etc.?
4. Public relations ability, i.e., can the nominee satisfactorily explain to a "concerned citizen" the importance of his job and the environmental safety of the operation?
5. What is the nominee's background, i.e., experience in aquatic plant management or related fields?
6. Does the nominee have a broad knowledge of aquatic plant management, i.e., weed identification, chemicals, biological controls, legalities, etc.?
7. Does the nominee respect and care for equipment?
8. Innovative ability, i.e., ability to improve and modify equipment and techniques?
9. Does the nominee keep abreast of current advancements in aquatic plant management technology?
10. General enthusiasm toward aquatic plant management.
11. Any other information you can offer concerning the nominee deserving the award.

Please send all nominations to:

Jim Wilmoth  
Rt. 1, Box 963  
Palatka, Florida 32077

Thank you.

*The Awards Committee*



## AT YOUR SERVICE . . . THE PROFESSIONAL AQUATIC WEED CONTROL SPECIALISTS — DISTRIBUTORS PENNWALT, CHEVRON, 3M, NALCO, A & V, JOHN BEAN & OTHERS

COVERING FLORIDA FROM —

TAMPA  
5414 N. 56th Street  
P.O. Box 1096  
Tampa, FL 33601  
(813) 626-2111

MIAMI  
2490 N.W. 41st Street  
P.O. Box 420981 Allapattah Station  
Miami, FL 33142  
(305) 635-0321

JACKSONVILLE  
1845 Wright Avenue  
Jacksonville, FL 33207  
(904) 398-3759

TOLL FREE WATTS IN FLORIDA: 1-800-282-9115



# Southern Mill Creek PRODUCTS COMPANY, INC.

TAMPA • MIAMI • ATLANTA

Plant Management continued from page 13

*charis* sp.) can severely restrict fishing along the shoreline.

Submersed aquatic plant problems include hydrilla, naiad, coontail, fanwort, and watermilfoil (usually variable-leaf milfoil). As with water-lilies, the majority of these occur in the older natural ponds which in many cases have low hardness and pH. Hydrilla problems are usually encountered in ponds located in populated areas.

#### IV. Evaluation of the Problem and Selection of Control Measures

After identification of the problem "weed", the next step is to determine the best type of control measure for the particular pond. Factors which need to be considered include pond usage, acreage of vegetation present, and physicochemical characteristics of the pond. The most important factor is pond usage. This will dictate how much control is needed and what kind of control to use. The basic types of plant management available to the Florida farm pond owner include mechanical, biological, and chemical control.

Mechanical plant control machinery has little application to farm pond situations with the exception of actual hand removal or cutting by hand or with a mower. Most commercial equipment is too expensive to lease or buy and can not be maneuvered in a pond. An exception is the use of cycle cutters to control lillies

in the larger, natural ponds. Improved versions of the hand technique include use of a standard power mower to cut grasses to the waterline and out to about two feet from the shore. Small acreages of cattails can be controlled with repeated cuttings using a machete. Mechanical methods avoid the use of chemicals but are labor intensive making them unattractive to most pond owners looking for a quick and easy solution.

Biological control, although excellent in theory has very little application to farm pond owners at the present time. The major drawbacks of this method are the long duration before control can be obtained, and in many cases adequate control is never obtained. If the pond owner could recognize a problem before it becomes severe, biological controls such as the alligator flea beetle and the water hyacinth weevil would be of considerable value in pond management. The grass carp, although illegal to use in Florida without a permit from the Florida Game and Fresh Water Fish Commission, is a highly effective control agent in farm pond situations. A sterile hybrid carp obtained by crossing the exotic big head carp and grass carp is currently being researched to determine its feasibility as a weed control agent.

Of the methods available, aquatic herbicides have the greatest potential to control the various aquatic plant problems in farm ponds. All E.P.A. approved aquatic herbicides are generally safe and effective when applied according to label directions after developing a use management plan. In some instances com-

plete control of all weeds is desired because the pond is used exclusively for swimming. A herbicide such as simazine can be applied which controls algae and many vascular plants. However, there are severe restrictions on irrigation and watering livestock. In the other extreme, a pond used only for watering livestock requires no weed control activities.



*A good example of a pond managed exclusively for swimming by the use of a non-selective herbicide.*

Most ponds are primarily utilized for fish production with minor emphasis on swimming or livestock watering. In most cases if water usage conflicts with herbicide label recommendation, this usage can be temporarily stopped long enough to allow significant weed control.

Water hardness, turbidity, temperature and oxygen levels are important water chemistry parameters to consider before utilizing herbicides. Copper based herbicides have increased activity on vegetation at a hardness below 50 parts per million. These products are also more toxic in "softwater."

The effectiveness of the herbicide diquat when used for submersed weed control can be drastically decreased by the presence of mud or clay particles in water. If a pond is normally muddy, a herbicide other than diquat should be selected for the control problem. Temperature also plays a factor in herbicide selection. Herbicides such as simazine are not recommended for temperatures above 75 degrees due to rapid plant die-off and corresponding low dissolved oxygen levels. If a considerable portion of the pond is to be treated at any one time it is advisable to conduct oxygen measurements to determine if levels are significant to off-set the oxidation of dead plant material. These samples should be checked at dawn to get the best indication of the lowest oxygen levels which will be present in your pond.

Once a herbicide has been selected the acreage of vegetation to be treated and average depths of water need to be determined to select the proper applica-

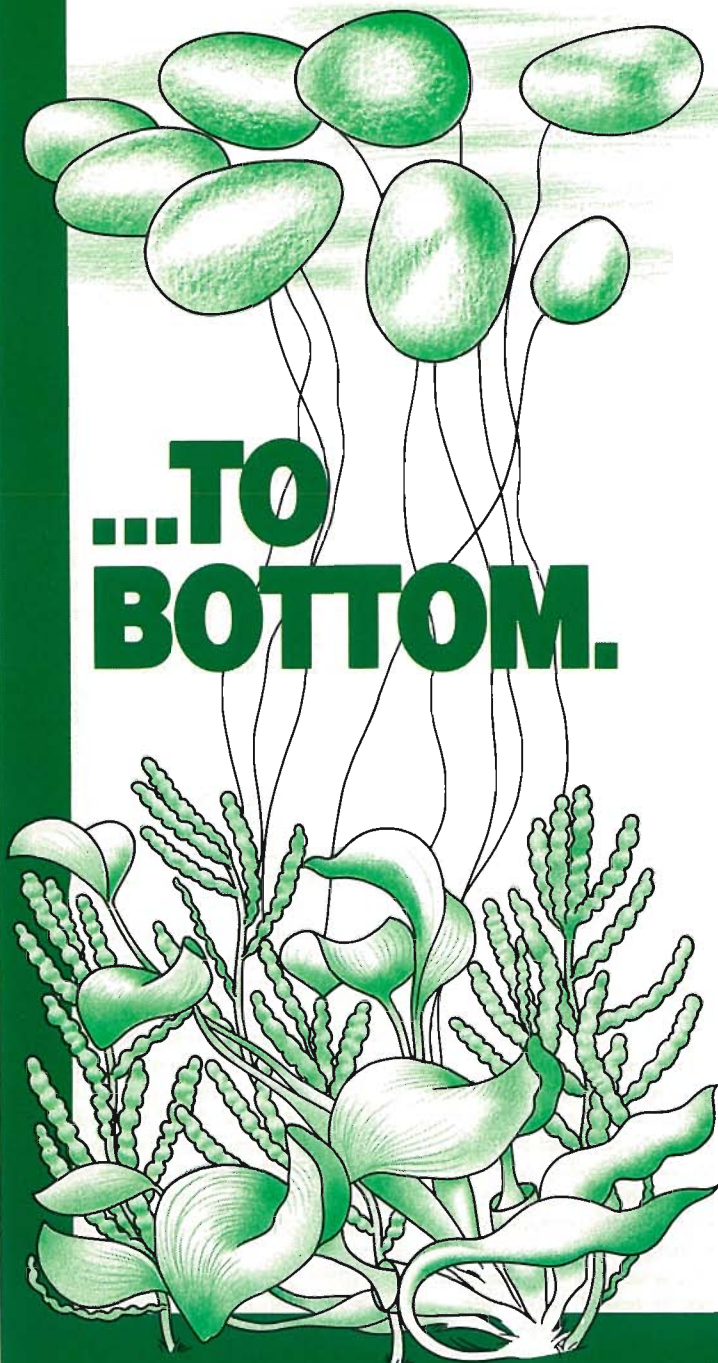


*Natural, low fertility North Florida ponds normally have only minor native plant problems.*



# DIQUAT CLEARS OUT WATER WEEDS FROM TOP...

...TO  
BOTTOM.



Water weeds that clog Florida's waterways are sunk when treated with ORTHO DIQUAT Herbicide-H/A. DIQUAT is a broad spectrum herbicide that kills both floating and submerged weeds—even the tough ones like hydrilla, water lettuce and water hyacinth. And DIQUAT works fast—in just a few days after application you can see dramatic results.

DIQUAT interrupts photosynthesis in plants. And DIQUAT is economical to use. It can be used to spot-treat small areas, or control larger infestations. When surface spraying, apply with ORTHO X-77® Spreader for best results.

Licensed applicators: see supplemental label for complete details.

ORTHO DIQUAT. It sends water weeds straight to the bottom.



**ORTHO**

Chevron Chemical  
Company

# DIQUAT

Herbicide-H/A

tion rate. In some instances, such as algae control, a measurement of water volume (usually measured in acre feet) must be determined for proper application of the herbicide.

None of the herbicides are cheap, so the label should be carefully read before purchasing a herbicide to make sure that it controls the vegetation which is causing the problem. Check to see that use restrictions on the treated water do not interfere with the intended use of the water and be certain that you have the capability to apply the herbicide in accordance with the label. If you are not sure, call the DNR regional botanist.

Most farm pond owners cannot afford to hire trained professional applicators nor purchase a spray pump to treat weed problems themselves. Granular herbicides are a major alternative for the pond owner. These herbicides, although more costly than liquid herbicides, do not require special application equipment and are available to control most submersed plants with copper liquid formulation, granular copper formulation or soluble powder can be effective and easily applied by most farm pond owners. However, copper does not degrade, it merely precipitates out into the bottom sediments.

The floating plants, hyacinths and duckweed, are probably the most difficult for the pond owner to treat. Small areas can be controlled by using one of the pump-up hand sprayers or one of the ultra low volume battery powered hand sprayers. To avoid contamination problems, separate sprayers should be used to control garden pests and plants in ponds.

In general, most treatments should be conducted on a clear sunny day and treatment should not consist of more than one-half of the pond (preferably one-third) at any one operation. Do not trap fish with your treatment program; start from the shore and work out to open water allowing the fish to move out away from the herbicide. Do not be alarmed if fish avoid these areas for up to a week. If you have fish bedding in certain areas, delay treatment until they go off the beds.

Listed below are sources of information available on pond management from various government agencies:

Subject	Source
Pond Construction	Soil Conservation Service
Pond Fertilization & Liming	Florida Game & Fish Commission and Soil Conservation Service
Fish Stocking, New Pond	Soil Conservation Service
Fish Stocking, 1-10 Acre Ponds	Florida Game & Fish Commission
Plant Management & Control	Department of Natural Resources

## COUNCIL FOR AGRICULTURAL SCIENCE AND TECHNOLOGY

# CAST

### What It Is, What It Does, and How It Operates

*Editorial Note: CAST was ten years old on May 26th. That's the anniversary of its incorporation. Starting with nine scientific societies, it has developed into a consortium of 25 societies representing most of the major food and agricultural science disciplines. The Florida Aquatic Plant Management Society is an associate Society member. Dr. William T. Haller is a member of the CAST Board of Directors.*

## CAST: WHAT IT IS

### Organization

CAST is a consortium of the following food and agricultural science societies (the year indicates when the society joined CAST):

- American College of Veterinary Toxicologists (1975)
- American Dairy Science Association (1975)
- American Forage and Grassland Council (1972)
- American Meat Science Association (1978)
- American Meteorological Society (1974)
- American Phytopathological Society (1976)
- American Society for Horticultural Science (1972)
- American Society of Agricultural Engineers (1974)
- American Society of Agronomy (1972)
- American Society of Animal Science (1972)
- Aquatic Plant Management Society (1979)
- Association of Official Seed Analysts (1973)
- Council on Soil Testing and Plant Analysis (1973)
- Crop Science Society of America (1972)
- Institute of Food Technologists (1977)
- North Central Weed Control Conference (1976)
- Northeastern Weed Science Society (1978)
- Plant Growth Regulator Society of America (1980)
- Poultry Science Association (1972)
- Rural Sociological Society (1975)
- Society of Nematologists (1972)
- Soil Science Society of America (1972)
- Southern Weed Science Society (1975)
- Weed Science Society of America (1972)
- Western Society of Weed Science (1978)

Through their representatives on the Board of Directors, the member societies control the policies and activities of CAST.

### Purpose

To advance the understanding and use of food and agricultural science and technology in the public interest by serving as a resource group from which the public and government may seek information on the science and technology of food and agricultural issues of current concern, and independently to identify developing issues of broad public concern on which food and agricultural scientists and technologists can provide information; to organize task forces of

food and agricultural scientists and technologists to assemble and interpret factual information related to these issues; and to disseminate the information in a usable and effective form to the public, the news media, and the government, as appropriate.

### Legal Status

Incorporated on May 26, 1972, in the State of Iowa as a nonprofit corporation. It is classified by the Internal Revenue Service as a public foundation within the provisions of Section 501(c)(3) of the Internal Revenue Code.

## CAST: WHAT IT DOES

### Publications Related to Educational Activities

*Reports* are CAST's primary output. They are statements under joint authorship on the subject addressed. Reports are authorized by the Board of Directors or the Executive Committee, usually in response to a specific request or announcement from Congress or a federal agency.

Reports are prepared by task forces of eminent authorities representing the various disciplines relevant to the subject. These persons, who are not necessarily members of CAST or of CAST member societies, are nominated by their respective scientific societies or by the task force chairperson. Task forces are charged with preparing a sound, factual statement on the particular subject they address, not with taking a position or making recommendations.

Task force members serve as scientists, not as representatives of their employers. They receive no honoraria but are reimbursed upon request for travel expenses to meetings. Their time is contributed by their employers.

Generally reports are of two types: (a) an original document bringing together the known relevant scientific facts about a current issue and (b) a review of the scientific content of a public document. The reports are not original research. Costs of preparing, publishing, and distributing the reports are borne by CAST.

*Papers* are speeches and other expository statements other than official letters, usually written by one person, that are of such character and length as to justify numbering them as CAST documents.

*Special Publications* consist of two or more documents, each with one or more authors, published within one cover; nonexpository subject matter; or both. The *Directory of Environmental Scientists in Agriculture* is an example.

*COMMENTS* from CAST are official letters and other comments of broad interest, usually written by only one person.

*NEWS* from CAST is a bi-monthly bulletin that provides information on CAST activities, including a summary of reports and other publications.

The *CAST Publications Catalog* is a

continually updated listing of CAST publications.

#### Publications About CAST

*Council for Agricultural Science and Technology* is a continually revised eight-panel general information folder, including an application for individual membership.

*Highlights of CAST History: 1970-1981* reviews important events in the formation and development of CAST. Updated annually.

*Articles of Incorporation* is the legal document establishing CAST as a nonprofit corporation. May 1972.

*Bylaws* is the operating document that implements the Articles of Incorporation. Revised as needed within the framework established by the Articles of Incorporation. July 1981.

*Policies and Guidelines* summarizes the policies and guidelines established by the Board of Directors to guide CAST activities. Revised as needed. February 1982.

*CAST's Funding and Credibility* reviews the issues related to the unrestricted grants that constitute CAST's principal income and explains the mechanisms by which CAST's scientific output is dissociated from the funding. December 1979.

*Sites and Dates of Annual and Semi-annual Meetings of Member Societies of the Council for Agricultural Science and Technology and Other Related Organizations* provides chronologic listings for three years and alphabetic listings for five years. Forty-four scientific food and agricultural societies and related groups are listed. Revised annually.

#### Publications Distribution

Publications are distributed to target audiences as appropriate. The most common audiences are federal agencies, congressional committees, Congress, newspapers, and other nonagricultural audiences. Copies of all publications are distributed to all CAST members except the individual members, who may obtain copies of most publications upon request. Publications are not copyrighted. Their secondary reproduction and distribution by interested individuals or groups is invited.

#### Other Activities

CAST serves as a source of names, addresses, and telephone numbers of scientists knowledgeable in food- and agriculture-related subjects of interest to newsmen and members of Congress. Occasionally, arrangements are made for participation of scientists in hearings, television programs, and radio programs.

CAST has sponsored six telephone "dial-ogues" in which eminent scientists were assembled to answer questions telephoned in toll-free by consumers and students throughout the 48 states. The first was on pesticides (1973), the second on food production (1975), and the third, fourth, fifth, and sixth on food

production, food safety, and nutrition (1976, 1977, 1978, and 1980).

## CAST: HOW IT OPERATES

### Board of Directors

The Board of Directors is the policy-making and governing body of CAST. Each member society is represented on the Board by one to three Directors, depending upon the number of members in the society. Directors are appointed by their respective societies for three-year terms. They may succeed themselves. Each member society determines its own method of selection. In addition, four members of the Board are selected by vote from the individual members of CAST. Except for the Executive Committee, all Board members are either representatives of member societies or representatives of individual members.

The Board of Directors meets semi-annually, with the annual meeting held in February. Between sessions the powers of the Board are delegated to the Executive Committee. In practice, the Board decides certain important matters between meetings by mail ballot.

### Executive Committee

The Executive Committee consists of the President, the President-Elect, the Past President, the Executive Vice President, and four Members-at-Large. Except for the Executive Vice President, who is appointed by the Board, all members of the Executive Committee are elected from the membership of the Board. The President-Elect serves succeeding one-year terms as President and Past President. Members-at-Large are elected for four-year terms. Members of the Executive Committee serve as individuals and are replaced on the Board by other representatives of their respective societies or by other representatives of the individual members, as the case may be.

The Executive Committee meets four times annually, once midway between and once immediately preceding each of the semiannual Board meetings.

### Officers

Officers of CAST for 1982-1983 are:

*President:* R. Phillip Upchurch, Tucson, Arizona

*Past President:* O. D. Butler, College Station, Texas

*President-Elect:* W. F. Hueg, Jr., St. Paul, Minnesota

### Headquarters Staff

*Executive Vice President:* Charles A. Black

*Vice President:* Theodore Hutchcroft

*Program Development Assistant:* Janice Lawlor

*Accountant/Office Manager:* Joyce Smith

*Secretaries:* Lois Bush and Nancy Sunstrom

### Members and Participants

*Society Members:* Nonprofit, scientific societies related to food and agriculture (generally national organizations) whose principal purpose is to advance the scientific and professional interests of their members. The member scientific societies control the policies and activities of CAST. Each society pays an

annual fee up to \$6,000 based on its membership. Four other classes of members and participants provide additional financial support.

*Associate Society Members:* Nonprofit societies related to food and agriculture, including (1) state societies, (2) national societies that are not classed as scientific societies, and (3) the following regional societies: (a) regional scientific societies that are branches of national societies dealing with the same subject matter, (b) regional scientific societies that do not qualify for society membership because they do not pay the dues assessed on society members, and (c) regional societies that are not classed as scientific societies. Annual fee: \$120 for national groups, \$60 for regional and state groups. There are eight associate society members.

*Sustaining Members:* (1) *For profit.* Companies, cooperatives, and financial institutions. Annual fees range from \$125 to \$6,000. There are 124 members in this category. (2) *Foundations.* Annual fees range from \$125 to \$6,000. There are five members in this category. (3) *Nonprofit membership-type organizations, generally trade and commodity associations, that are not operated for scientific purposes.* Annual fee: \$120 for national groups, \$60 for regional and state groups. There are 253 members in this category.

*Individual Members:* Persons supporting the objectives of CAST and wanting to keep informed on its activities. Annual fee: \$15. They elect four from their classification to serve on the Board of Directors, the only nonsociety representation. There are over 3,950 individual members.

*Participants:* Individuals and organizations who provide grants in amounts other than those specified for the relevant member category. Grants are either unrestricted as to purpose or are solicited for specific purposes made known to potential donors. There are nearly 100 participants.

### Subscriptions

Libraries and other information centers as well as individuals may subscribe to CAST publications. A subscription for one calendar year is \$35 in the United States, Canada, and Mexico, and \$50 elsewhere.

### Other Income

CAST sells its publications at costs determined by the Board of Directors.

### Tax Status

CAST is a tax-exempt corporation. Membership fees and contributions are tax-deductible.

### Budget

The budget for the 1981-1982 fiscal year (October through September) is \$400,600, an amount that is expected to be covered by current income from membership fees, grants, and publication sales. Funds are used for travel and subsistence, printing, mailing, and administrative expenses.

Florida Aquatic Plant Management Society, Inc.  
2555 S.E. Bonita Street  
Stuart, Florida 33494

BULK RATE  
U.S. Postage  
PAID  
Stuart, Florida  
Permit No. 50



SIMPLE & NON-TOXIC & PROVEN to  
SUPPRESS HYDRILLA, weeds & algae

ECONOMICAL, as it is long lasting

USE in contained ponds to maintain the  
NATURAL BLUE COLOR

APPLY when growth is on bottom or  
AFTER herbicide  
for CONTINUING CONTROL

AQUASHADE INC., P.O. BOX 198,  
ELDRED, NEW YORK 12732 (914) 557-8077

*Aquatics*



The official  
quarterly publication  
of the  
Florida Aquatic  
Plant Management Society

Only \$5.00 a Year  
Please remit with order to:  
AQUATICS  
P.O. Drawer 2476  
Stuart, Florida 33495



Asgrow Florida Company  
subsidiary of The Upjohn Company

Aquatic & Non-Crop Herbicides —

Banvel 720  
Banvel 4 WS

Roundup  
Velpar

Aquathol K  
Sonar

Koplex  
K-Tea

Invert Adjuvants — **Asgrow "403" Invert Adjuvant**  
SpraMate

AVAILABLE IN 14 DISTRIBUTION CENTERS

Marianna, Alachua, Vero Beach, Wauchula, Ellenton, Fort Myers, Belle Glade, Boynton Beach,  
Homestead, Naples, Immokalee, Plymouth, Plant City, Hastings