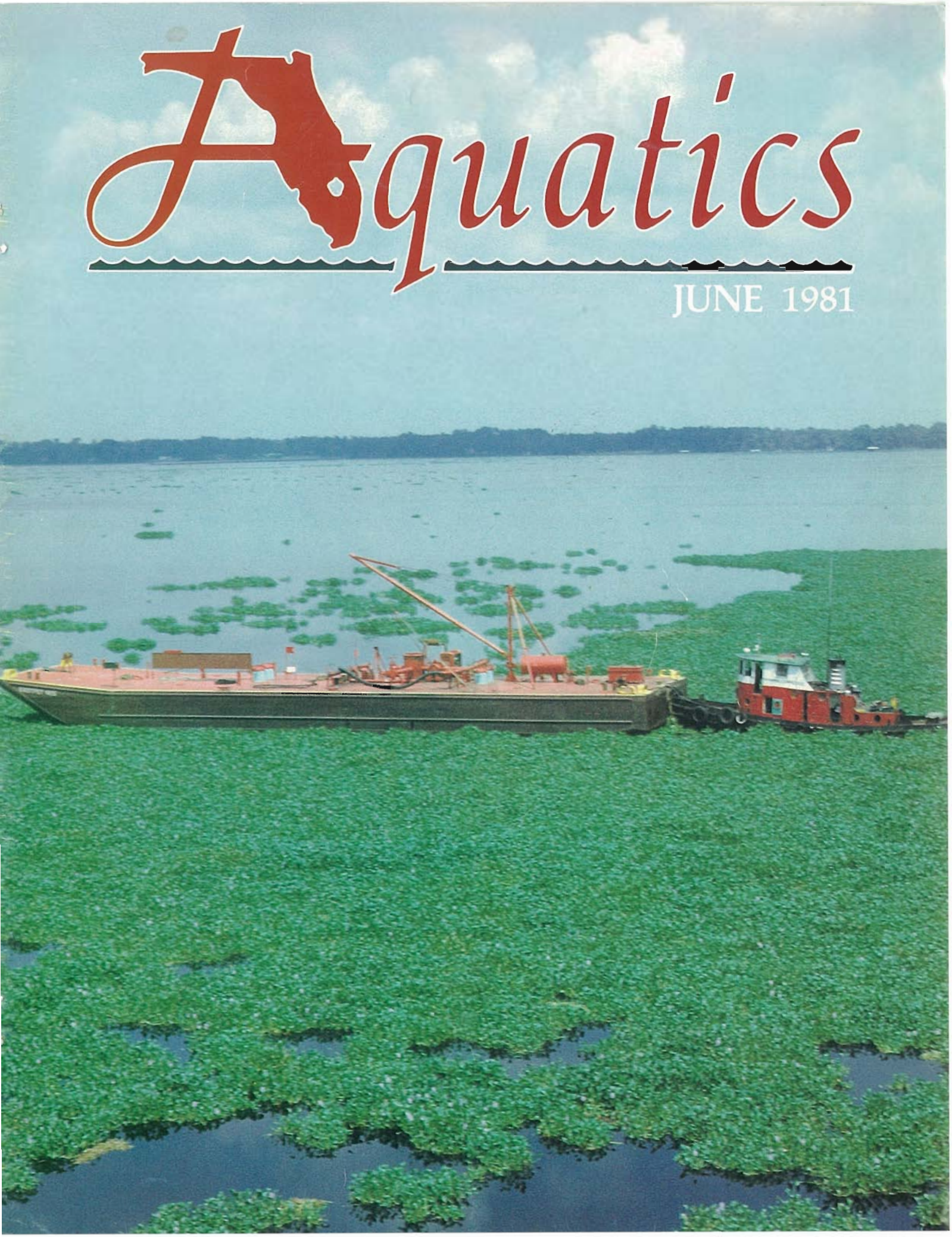
Aquatics

JUNE 1981



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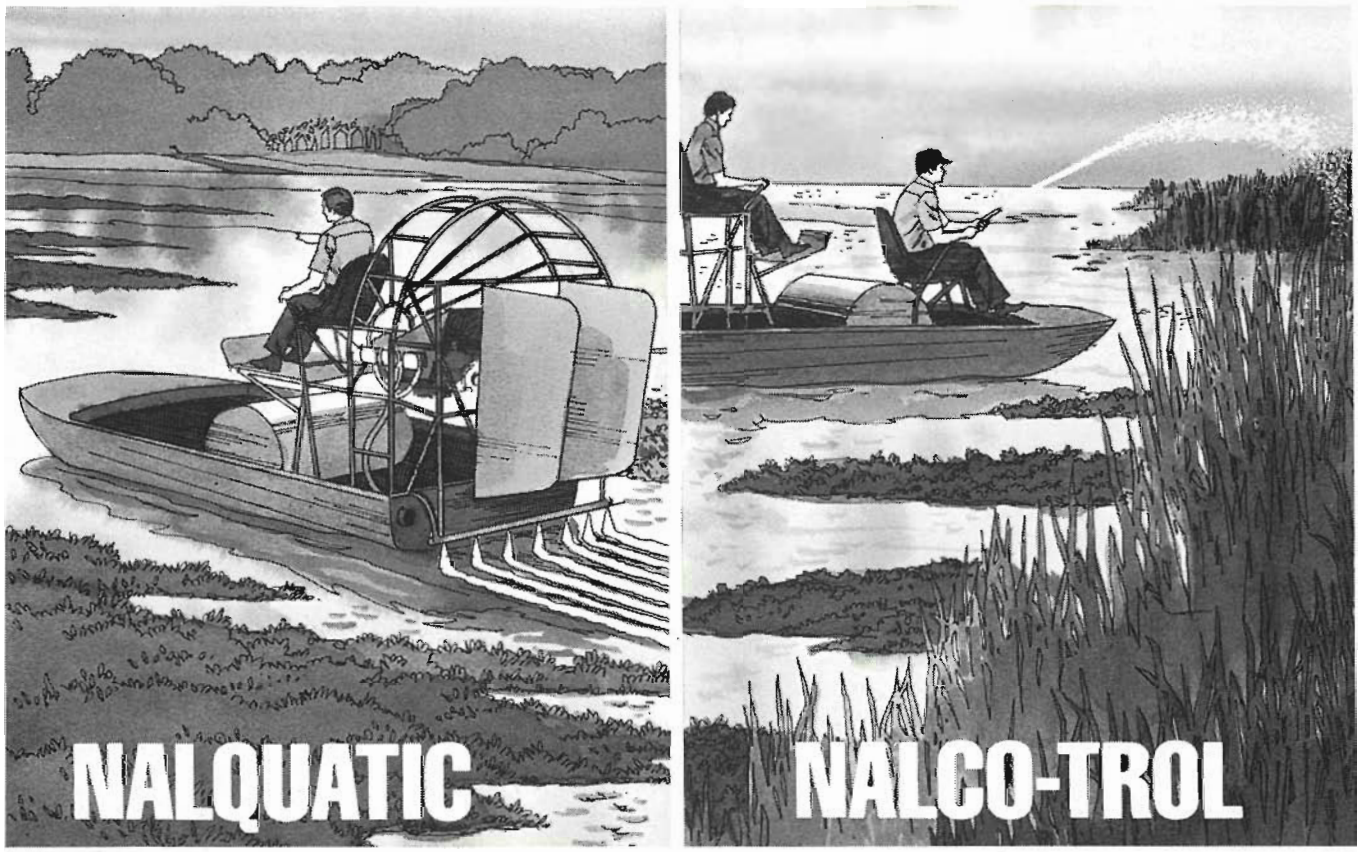

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Editorial
Paul C. Myers

The present ongoing turmoil in aquatic weed control permitting has brought to light, once again, the need for professionalism in aquatic weed control. Due in part to isolated instances of poor judgment, misuse, or neglect, it appears we are to be saddled with regulations which are more restrictive than we have known to date.

The cooperative working relationship most have had with the Bureau of Aquatic Plant Research and Control, within the Department of Natural Resources, is in a state of flux. Philosophy exhibited in the draft permitting rule is cause for apprehension and reflects a staunch regulatory approach.

The multiple agency responsibility in waters of this state has and will continue to overlap under the present state structure. By mandate of law and through interagency agreements the interest of each agency can be served while giving the public maximum benefit for multiple or designated water usage.

Aquatic weed control applicators, as a whole, are aware of the many ramifications which must be addressed in making treatment decisions. Through knowledge, technology and experience, aquatic weed control must proceed in the most effective, least damaging mode. This cannot be totally mandated by rules, which many times hinge on interpretation. Rather, due to the diversity of waters and circumstances encountered, local managers must be relied upon to make sound decisions.

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

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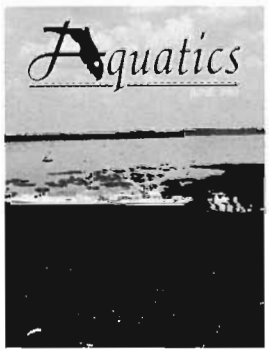
July 10	FAPMS Board Meeting, Melbourne
July 12-15	Aquatic Plant Management Society's Annual Meeting, Coliseum Ramada Inn, Jackson, Mississippi
Oct. 21-23	FAPMS Annual Meeting, Orlando



COVER

Water hyacinths have blocked traffic in the St. Johns River many times in the past ninety years. Photo compliments of U.S. Army Corps of Engineers.

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, Fla. 33850.

Azolla is often found growing on mats of hydrilla.

AZOLLA

David L. Sutton*

A handful of Azolla offers promise as a new aquatic crop.

Azolla, a small reddish to green free-floating fern of the Salviniaceae family, is generally known by its generic name, Azolla, but is sometimes called water fern. The genus is composed of some six species found throughout the world, but they are generally more common in tropical regions. A few species, however, tolerate cool weather and frost.

Azolla is a fern, whereas the majority of commonly known aquatic plants are seed producing plants. In Florida, *Azolla caroliniana* Willd is abundant, and individual plants are up to 3 cm in length with bilobed, overlapping leaves which are 0.9 mm long and 0.6 mm wide. The upper portion of the leaves is above the water surface while the lower surface is submerged. Simple unbranched roots are attached to the lower surface of the leaves.

This fern grows on the water surface and appears to require protection from wind and wave action for maximum growth. In the fall and winter, mats of azolla are often found growing in South Florida in association with hydrilla (*Hydrilla verticillata* Royle) stands which have grown to the surface of the water.

Most taxonomic books consider azolla to be of little beneficial economic importance. Azolla is considered a weed at times when it proliferates to such an extent so as to interfere with fishing, livestock watering and other water uses.

Azolla has been cultivated for nearly 400 years, but only within the last few years has it received publicity as a beneficial and useful aquatic plant. Azolla is unique because of its intimate association with the blue-green alga *Anabaena azollae* Strasburger, which is capable of fixing molecular atmospheric nitrogen into a form that the azolla plant can use. Because of this association, azolla is not dependent on the availability of reduced or oxidized forms of nitrogen in its immediate environment to meet this nutrient requirement like most other aquatic plants.

Interest in azolla with its associated alga has increased in recent years because of the rapidly escalating costs for nitrogen fertilizers, particularly the dependence on natural gas for ammonia production. It is estimated that 1.6% of the world's fossil-fuel based energy is required to produce fertilizer, of which nitrogen is a major component.

Azolla serves as the primary nitrogen source for some 40,000 ha of rice production in Vietnam and approximately 1,300,000 ha in China. This recent discovery of the extensive use of azolla as a fertilizer crop in rice prodution has stimulated research in the U.S. to evaluate the potential of this aquatic plant as an inexpensive method to photosynthetically produce nitrogen.

Azolla growth in farming ditches helps to shade growth of troublesome submersed weeds. Incorporation of the plant into the soil may provide an inexpensive nitrogen source.

Studies in California have shown that azolla has the potential of supplying up to 50% of the nitrogen requirements for rice production. Culture of rice in Arkansas, Louisiana, and Florida may benefit equally as well.

Growth of azolla on nutrient enriched wastewater high in phosphorus but low in nitrogen, such as that generally found with domestic sewage effluent, is an interesting prospect. Plants grown in this manner could be composted for use in growing other plants.

Another potential use of azolla is in fish production, particularly the culture of herbivorous fish for aquatic weed control purposes. An inexpensive feed source for culture of grass carp (*Ctenopharyngodon idella* Val.) or hybrids of the cross of male bighead (*Aristichthys nobilis* Rich.) and female grass carp to size sufficient for stocking might be accomplished in a closed-circulation fish culture system. In such a system the azolla would be grown on the fish wastes and, in turn, the plants be fed to the fish. The algae contained by the azolla would assimilate atmospheric nitrogen, and the azolla would use the fixed nitrogen and mineral wastes generated by the herbivorous fish. The fish then, in turn, would feed on the azolla and incorporate nitrogen contained in the plant. Wastes from the fish would help provide nutrients to grow the azolla. Such a fish culture system might be relatively energy efficient.

Considerable research is necessary before azolla will be a major crop plant in the U.S. With the dependency of Florida on fossil fuels, azolla, through its symbiotic relationship with a blue-green alga, may play a future role in helping produce other traditional terrestrial and aquaculture crops. Azolla has the potential of becoming a new agricultural crop as Florida and other areas of the country seek innovative ways to increase food production and help reduce our dependence on limited fossil fuels.

* Professor and Aquatic Weed Physiologist
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MAINTENANCE CONTROL OF WATER HYACINTH

By Bill Haller*

A recent issue of *Aquatics* contained the statement, "Aquatic plant pest number one no more, water hyacinth maintenance control is a success story." Most everyone knowledgeable of aquatic weed control agrees and also recognizes the vigilance and effort required to keep water hyacinths under control. Certainly, there are farm ponds, canals and little-used ditches that are bank to bank water hyacinths. But the major waters in the state are essentially hyacinth free, so the once serious aquatic weed problem in Florida is solved. Or is it? Now that the water hyacinth is being managed at low populations, the priorities in the public's mind have changed. Influx of new residents, human forgetfulness, and the current lack of hyacinth problems add up to "why waste time on our lake treating 50 to 100 square foot patches of hyacinths, when they aren't bothering anyone?"

Was it that long ago that the St. Johns River was bank to bank hyacinths at Astor, Palatka, and even in Jacksonville? Was it that long ago that many lakes and flood control canals contained 30, 50, 75 percent or even greater cover age of water hyacinths? Ask Vernon Myers, Bob Gates, Clayton Phillippy, Frank Wilson or others if killing water hyacinth was ever number one in the public viewpoint! Times have changed, and it's important to understand and be able to assure the public that hyacinths can be a serious problem, and that maintenance control programs are safe environmental and economic necessities.

There are individuals who can never be assured of the safety and use of aquatic herbicides. They should understand that maintenance hyacinth control programs result in a dramatic reduction in the amounts of herbicides being applied in the environment. Studies in ponds, canals, and even records of the hyacinth control program on the St. Johns River illustrate this fact. Prior to initiation of maintenance hyacinth control programs on the St. Johns River in the mid-1970s, the Corps and GFWFC spray crews used up to 10,000 gallons of 2,4-D per year. In FY 1976, for example, 6,312 gallons of 2,4-D were used. Now the hyacinths are under control and in FY 1980 the Corps used 4,350 gallons of 2,4-D or diquat on the 300 mile long river and its tributaries. (J. Joyce Per. Comm.: J. Aquat. Plant Manage. Vol 15, 1977.)

Data from ponds or lakes more dramatically illustrates the reduction in chemical use in a maintenance control program. In 1975 we initially treated a four-acre hyacinth infested pond, recorded 2,4-D use, and monitored water quality for four years. (W. Brower, Ph.D. Dissertation, University of Florida, 1980.) The pond, located in a citrus grove in Marion County, was totally covered with water hyacinth. Game Commission crews treated the pond on May 15, 1975 with 2,4-D at a rate of 3 lbs./acre. Regrowth and areas run over by the airboat dictated another treatment of the total area on July 15, 1975, again with 3 lbs./acre. After this treatment, the mats began to decay rapidly and by November, 1975, wind and wave action produced approximately 3 acres of open water. The remaining floating islands and hyacinths (1 acre) were retreated on November 19, 1975 with 2,4-D (3 lbs./acre). This was the final treatment required during the 1975 growing season. Total chemical used in the pond was 27 lbs., or 6.75 lbs./acre, in 1975. In the spring of 1976, the pond was essentially open water and only a fringe of plants remained which required treatment (0.5 acre at 3.0 lbs./acre. In 1976, the pond received only 1.5 lbs. of 2,4-D. Since 1976, the pond has not required chemical treatment, an occasional hyacinth is hand removed when it occurs, and the pond currently produces excellent bass and bream fishing (pond was stocked in 1976).

These two examples, obviously at both extremes of size, demonstrate the reduction in the amounts of chemical required under a good, vigilant control program.

Also important in your public relations is a good working knowledge of the plants, chemical, and spray systems you are using. Does the general public know that the spray from the handgun is not pure chemical, but is 2 or 3 lbs. of herbicide diluted with 50 to 100 gallons of water? You, in fact, are using only a 2 to 6% solution of chemical! Studies have also shown that 60 to 80% of the spray solution remains on the plants and never reaches the water. The lower dilution (50 gallons/acre) obviously causes less

*Past President, Florida Aquatic Plant Management Society

runoff, and higher amounts of chemical stay on the plants. There is a trade-off here between adequate coverage and greater runoff resulting in more chemical in the water column. Higher dilutions favor better coverage, but also increase runoff. Inverts, polymers, and aerial application probably result in less runoff than traditional water-chemical sprays, but I know of no published research on this subject.

If median values are assumed (3 lbs./acre, 30% runoff), the chemical application may result in approximately 1 lb. of chemical actually entering the water in the hyacinth mat. Assuming 5 ft. of water depth, the 2,4-D concentration in the water will be approximately 0.07 ppm, far below the levels which are known to adversely affect fish, insects, and other non-target organisms.

Any currently labelled herbicide used in water hyacinth control dissipates or is biologically degraded rapidly. In closed ponds such as the four acre pond described earlier, residues are often nonexistent in the water within a week after spraying. Certainly one important criterion for registration of most aquatic herbicides is a short half-life in water. All the registered products used in Florida for water hyacinth control comply with this important parameter. Another point with which to reassure the public is that hyacinth control and all other legal aquatic plant management programs utilize federally approved herbicides. Industry spends millions of dollars on toxicology, carcinogenicity and other sophisticated laboratory and field testing under Federal supervision before a product is labelled, and even then testing continues.

There is considerable literature available on the growth, control and reproduction of water hyacinth. After several years experience I have concluded that the water hyacinth is an organic polluter. The plant is the prime aquatic candidate for use in methane or energy production and for use in nutrient removal in sewage systems. Why? Because the plant grows so fast, producing over 60 tons of dry weight per acre per year. Standing crop biomass, the weight of a mat of water hyacinth, is commonly 250 to 300 tons/acre fresh weight (25 to 30 tons/acre dry weight), which makes it understandable why mechanically harvesting hyacinths is so slow and costly.

This high productivity results in deposition of organic detritus on the bottoms of our waterways. Measurements over a growing season indicate that natural turnover of leaf litter and root sloughing of water hyacinths result in deposition of approximately 1.7 tons of detritus per acre per year (dry weight). It was also noted that when a severe frost occurred the roots of the hyacinths naturally dropped off the plant at or just below the water surface. Obviously, this is an adaptation to keep the plant (meristem) afloat after the air filled leaves are destroyed by frost and they lose their bouyancy. Chemical control of hyacinths also produces detritus. The chemical control program resulted in deposition of 4.8 tons of detritus per acre per year in experimentally treated ponds. Considering the standing crop when sprayed, it appears that about 20 to 30% of the sprayed hyacinths end up forming detritus and the rest of the detritus oxidizes and decays at the water surface. Therefore, there should be no real hurry in causing a dropout to occur after spraying, as rotting on the surface results in less detritus on the bottom.

Obviously chemical control of water hyacinth silts the bottoms and therefore should not be done. WRONG! Back to the treated and untreated ponds since 1975. The untreated pond has in the past 6 years deposited 1.7 tons per acre per year for a total of 10.2 tons of organic

Water Hyacinth *continued on page 11*

THE 1980 FLORIDA AQUATIC FLORA SURVEY REPORT

At the time of this writing, the 1980 Florida Aquatic Flora Survey Report is near completion. Needless to say, just to survey the waters of this state is a great task, not to mention compiling the data and attempting to present it logically and accurately. Unfortunately, the 1979 report cannot be compared to the 1980 report on face value alone. There are a few changes.

The most major change is the criteria used to designate what type of water system was to be surveyed. In the 1979 survey, all public water bodies 100 acres and larger were surveyed, in addition to the 60 major river systems. In all, a total of 1,160,442 surface areas were surveyed, which consisted of 371 lakes and the rivers. This acreage figure represented approximately 41% of the 2.8 million acres of water in Florida. Last year, 1980, due to available time and manpower, the survey areas were reluctantly reduced. All public waters 1,000 acres and larger were surveyed. Those less than 1,000 acres and greater than 100 acres were surveyed if they were known to have hydrilla, Eurasian water milfoil, or limnophila present. This represents the major difference in the reports.

The other significant change is that canal data has been omitted due to several factors. First, and most important, determining canal acreage is nearly impossible until the responsible agencies accurately compute the acreage of canals within their jurisdiction. Due to the continuing increase in construction in the central and southern part of the state, additional canals are being built constantly. Obviously, this problem does not exist for rivers and other natural water systems to the degree associated with man-made canals.

Many smaller agencies, towns, subdistricts, and some of the larger water management districts have no accurate figure for the canals present. To measure the length and width of these canals throughout the state would take a tremendous effort; therefore, the 1980 report does not address the canal situation. Hopefully, future aquatic flora reports will contain this important data depending upon canal acreage availability.

What does the 1980 aquatic flora report contain? Plenty. A total of 138 lakes and 59 rivers were surveyed for all aquatic vegetation present. Approximately 1,067,000 acres were surveyed, compared to 1,160,442 acres reported for the 1979 survey report. Over 30 families of plants containing 90 aquatic species are listed and described in the 1980 report. Native and nonindigenous species are listed and their distribution shown by county. Tables and figures are included and have been modified for comparison of the two reports.

The following is a brief summary of the more important findings contained within this report. Over 98% of the lakes and 75% of the rivers surveyed contained nonindigenous aquatic species. Hydrilla was found in 54% of the lakes and 39% of the rivers surveyed. Water systems totaling nearly 800,000 acres are reported to be infested with hydrilla. The area hydrilla occupied, based on condensed abundance (which means 100% bottom cover), was equivalent to 32,418 acres. Hydrilla was newly detected in eight lakes over 1,000 acres in size and one river. These newly infested waters compile a total of 53,547 surface water acres. Water hyacinth was reported to be present in lakes containing a total of 874,403 acres and rivers with 90,270 acres. This exotic species occurs in 64% of the lakes and 52% of the rivers surveyed. Only 5,709 acres, approximately one half of last year's reported figure (excluding canal data), was detected in 1980. Acreage of lakes and rivers in which nonindigenous species were found totaled approximately 1,055,000 acres of the 1,067,909 acres surveyed. Condensed abundance of nonindigenous species was nearly 54,000 acres. Native species condensed abundance totaled over 159,000 acres. Total plant acreage for 1979 and 1980, both indigenous and nonindigenous, was 213,838 and 212,779, respectively.

A limited number of copies of the 1980 Florida Aquatic Survey Report will be available to those concerned with aquatic plant management. One per request, please. Contact the Bureau of Aquatic Plant Research and Control, Florida Department of Natural Resources, 2900 Commonwealth Blvd., Tallahassee, Florida 32303.

*Senior Biologist
Florida Dept. of Natural Resources

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2,4-D SAFE FROM DIOXIN ACTION

Agriculture Canada has taken action to ban the production of some 2,4-D products in Canada and to control the composition of 2,4-D products sold in the Canadian market in the future. The products which will be affected by this action contain esters of 2,4-D. This action is based on the Canadian findings, announced last fall, of three types of dioxins in 2,4-D products sampled from the Canadian marketplace. The dioxins which they found are 2,7 dichlorodibenzo-p-dioxin, 1,3,7 trichlorodibenzo-p-dioxin, and 1,3,6,8 tetrachlorodibenzo-p-dioxin. Some of the samples tested were free of dioxins. When they were present, they ranged in concentration from 5 ppb to approximately 8000 ppb. None of the samples tested contained the highly toxic 2,3,7,8 tetrachlorodibenzo-p-dioxin which is present in 2,4,5-T.

CURRENT EPA ACTION

The Environmental Protection Agency is coordinating its review activities on 2,4-D with Agriculture Canada. When the Agency was informed of the Canadian analytical findings, it began a sampling program to determine whether dioxin contaminents are present in U.S. products. The first phase of this sampling process is nearing completion. The Agency has tested 30 samples of technical 2,4-D acid and ester products and products containing amine salts of 2,4-D. These products were taken directly off the shelves at the production sites. The preliminary findings are as follows: 27 of the samples are free of any dioxin, using a method of analysis sensitive to 1 ppb; 3 of the samples contain the 2,7 dichloro-dioxin in concentrations below 100 ppb.

The EPA sampling program to date has confirmed that there is a significant difference between 2,4-D products sold in the U.S. and in Canada. This may be due to differences between U.S. and Canadian manufacturing processes.

The Agency feels that there is no justification for regulatory action to change current uses of 2,4-D products in the U.S., nor to prohibit production of 2,4-D products in the U.S., for the following reasons. The products tested from the U.S. marketplace are either free of dioxins or contain them at extremely low levels (less than 100 ppb).

There is little data available on the toxic effects of these dioxins, but existing data indicates they are significantly less toxic than the 2,3,7,8 tetra-dioxin found in 2,4,5-T. Based on the preliminary analyses that the Agency has conducted using available data, the concentrations found in U.S. manufacturing-use products do not appear to pose a health hazard.

ONGOING EPA REVIEW ACTIVITIES

EPA has a number of review activities under way to assess the safety of 2,4-D. The Agency will continue to sample 2,4-D products to determine whether U.S. manufacturing processes can consistently produce 2,4-D products in the range of the U.S. products which have already been tested.

The Agency will complete a detailed review of the available data on the three dioxins identified in 2,4-D products. In addition, we will make an assessment of additional studies which may be needed and where these studies should most appropriately be conducted.

The Agency also has a long-term effort under way to require additional acute and chronic toxicity data on 2,4-D. On September 2, 1980 EPA sent a data call-in notice under FIFRA 3(c)(2)(B) to all registants of 2,4-D products. Major registrants of the technical 2,4-D products subject to the notice are negotiating for joint production of the data. They have activities under way to prepare for the testing.

The EPA is developing a long-term work plan for a comprehensive review of the 2,4-D compounds. This work plan will include a complete registration standard review of 2,4-D, to be completed by the time the last studies are submitted. The Agency will review the chronic toxicology studies and the results of our analytical testing as they are submitted to determine whether a change in our regulatory position is warranted, before the entire review is complete.

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Water Hyacinths *continued from page 7*

detritus per acre. The chemically treated ponds incurred a deposition of 4.8 tons per acre in 1975-76 and no hyacinths have grown in the pond since. So in the long run (6 years), the hyacinth control program has reduced organic detritus by 5.4 tons per acre!

When you consider the many lakes in Florida with heavy organic bottoms one wonders what role the hyacinth has played in the formation of these heavy silt loads. This is why I often jokingly refer to the theory that the only good hyacinth is a dead hyacinth.

The growth of hyacinths is a function of their reproductive capability. Often one hears that the plant reproduces itself by forming daughter plants every 7 to 10 days. This is true, but not in all waters at all times of the year. Under ideal conditions of high temperature, high humidity, high light, high nutrients and low plant densities, hyacinths will double in about 7 days. Several times we have heard a farmer say that he removed almost all the hyacinths from his pond and they didn't come back for a few weeks, and then the thing was darn near covered again. A square yard of water hyacinths contains about 100 plants. If that square yard is dispersed a little, it could grow to an acre in about three months. Hyacinths produce flowers throughout the growing season and seed production occurs sporadically. The flower only lasts for a couple of days, after which the stem forms a crook neck, forcing the flower spike into the water. The seeds (if the flower is fertilized) continue developing under the water for about a week, then, as the flower decays, the seeds fall to the hydrosoil. Seeds are apparently not important to hyacinth management programs except where drawdown or drought conditions lower the water level and seeds germinate along the shoreline. For the most part, however, the seeds are of little concern.

The economic savings of hyacinth maintenance programs are evident from the previous discussion. Savings in herbicide costs alone would vary from 30% in major systems to 100% on small lake situations, where hyacinths can actually be eradicated from the system. Labor savings and related operational costs are also reduced.

Simply looking at detritus formation, maintenance programs are obviously of greater environmental benefit than letting the plants get out of hand. Studies have shown reduced oxygen levels under large hyacinth infestations, and no fish survive under a 100% infestation. Minimal short-term environmental impact occurs when small areas are treated over a longer period of time. Everyone with aquatic experience will agree that there is less impact on a lake if 1% of the lake area is treated three times a year rather than 30% of the lake once every two years. That is the bottom line between treating aquatic weeds and aquatic plant management!

This article has certainly been negative to the water hyacinth, and, I believe, rightly so. Hyacinths serve useful purposes, but on the balance sheet, this exotic plant has done more harm than good. I recognize that hyacinth roots harbor many aquatic insects and minnows on which game fish feed. Hyacinths produce shade and bass like to lay under the mats. Fishermen in many tropical and underdeveloped countries construct a large frame in lakes or rivers and fill it with water hyacinths. After 5 to 7 days, they encircle the hyacinths with a fine mesh net and toss the frame and plants out of the net. Then the net is slowly pursed and all the fish which were attracted to the hyacinths for feed and shade are captured.

Thus, some Florida fishermen have objections to reducing hyacinths to minimal populations. In waters with no structure, a patch of water hyacinths, brush piles or old tires very effectively act as fish attractors. The problem, as has been pointed out, is that hyacinths can rapidly get out of hand. Also, hyacinths shade the bottom and crowd out native species such as lotus, lilies, maidencane, eelgrass, and other emergent and submersed plants. Rather than having a single type of plant predominate, wouldn't a diverse mixture of emergent, floating and submersed plants benefit the fisheries of our lakes and rivers? There is no documented answer to this question at this time.

Another controversial fishing topic is the effect of chemicals, particularly 2,4-D, on the feeding habits of bass. We have begun some studies and surveys in this area with bass clubs. It turns out that there are almost as many opinions on this topic as there are fishermen. The two major lines of thought are that bass will not feed in an area treated with 2,4-D, or they leave the treated area. Also, bass are believed by some to not feed on wild shiners caught in a chemically treated area and fished in another nontreated area. The other major opinion is that bass and other fishes are attracted to treated water hyacinths because, as the hyacinths decay, they release insects, minnows, and other food

Water Hyacinths *continued on page 12*

Water Hyacinths *continued from page 11*

organisms that attract larger sportfish. This appears to be an easily researchable problem and data collection will be conducted over the next several months.

Agreement exists that extensive infestations and growth of water hyacinths are detrimental to everyone concerned. Aquatic weed control programs have successfully and safely reduced hyacinths from the number one weed problem to a manageable maintenance program in most areas. The introduction and establishment of biological organisms, such as insects and diseases, are further assisting the maintenance control programs.

Public priorities have changed and a public relations program is essential in most large control programs. The public at large is not aware of potential growth and capabilities that hyacinths possess for producing problem infestations. Legislators and state regulatory agencies also change over time and many of them are like the public at large, ignorant of the potential problems of hyacinth growth. Control or management of any pest, insect, weed, or disease is most effectively handled in a timely manner. In the projected time it takes to get a permit reviewed by state agencies, that square yard of hyacinth can become an acre!

AQUA-VINE

FAPMS
Annual Meeting Update

Call for Papers

Time is speeding by and before you know it you'll be packing your bags to attend the October, 1981, FAPMS meeting in Orlando. Unless you wish to sit in silence for 2½ days, we are going to need participation from the membership.

Share your experiences, research projects, wonder techniques, energy saving tips, and other words of wisdom with us. Last year's program was an excellent one with a good diversity of papers. **Become active and participate!** This is the year for those of you who have never presented a paper to be heard.

Please send the title of your paper to be presented to me.

David P. Tarver
2416 McWest Street
Tallahassee, Florida 32303

Products Display

Exhibit space at the Annual Meeting, October 21-23, will be $100. We would like to encourage those displaying their wares to contact Larry Maddox, Local Arrangements Chairman, 305/254-1761.

Equipment Demonstration

Be thinking about participation in the equipment demonstration. Every operation has similarities and differences to be shared. Plan to bring along, for display or demonstration, a spray boat, mechanical harvester, truck rig, lazor destroyer or whatever you use in your aquatic weed control program. For more information and detail, contact Herb Cummings, 305/592-5680.

Books Available — *Aquatic and Wetland Plants of Florida*

At last, reprinting of *Aquatic and Wetland Plants of Florida* has been completed. This color plated identification text is now available free of charge to those involved with Florida's aquatic ecology. Please hold your request to one per person, as the supply is limited. There have been no major changes in this new edition; therefore, if you received the 1978 text, please do not request the latest edition.

Address your request to:

Bureau of Aquatic Plant Research and Control
Florida Department of Natural Resources
3900 Commonwealth Blvd.
Tallahassee, Florida 32303

PEOPLE ON THE MOVE

Dr. Batterson Joins IFAS Faculty at AREC Ft. Lauderdale

Dr. Ted R. Batterson has recently joined the faculty as an Assistant Professor at the University of Florida Agricultural Research and Education Center in Fort Lauderdale, Florida. The

People on the Move *continued on page 15*

M168-2

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Joe Joyce, Presidential Message

I wanted to take this opportunity to express to the members of FAPMS my appreciation and gratitude for the privilege of serving as President of the Florida Aquatic Plant Management Society (FAPMS). As President, I have become even more impressed with the comradery, professionalism, and total dedication to the aquatics industry of the FAPMS members.

Many times I have said, "no one merely works in aquatics; they become a part of it, and it becomes a part of them." This fact has been reinforced many times during recent months by the concern many of the members have expressed over the numerous changes which have occurred within Florida's aquatic plant management industry. Any time there is a change or proposed change in the pattern in which we operate or the persons with whom we deal, there is a period of anticipation and concern. As often as not, a change in direction or a review of the manner in which we operate is beneficial. Thus, as this new program direction unfolds, I urge each of you to continue to (1) operate in your characteristic professional manner, (2) maintain a watchful eye on the evolution of this new direction, and (3) provide helpful and appropriate input to these agencies, companies or individuals who are responsible for the development of effective aquatic plant management in our State. As a group, we have been extremely effective, and our voice has been, and will continue to be, heard.

Now, if I can get off the soap box for a while, I want to relay to you some of the things the Board is attempting to accomplish this year. Believe it or not, Carlton Layne, Bill Maier and Paul Myers are in the process of computerizing our mailing and membership list in one central location. As President, I am grateful for their work because it means I'll finally get on the mailing list. Also, we are looking at various investment options in which to invest some of the Society's funds. Details of this effort will be reported in the news letter.

Finally, I want to express my appreciation and I am sure that of the Society's for the excellent job Paul Myers is doing as our new Editor of Aquatics. He is certainly maintaining the high standard set by our previous Editor, Bill Maier.

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People on the Move *continued from page 12*

position he fills was created with the establishment of the Aquatic Weeds Research Center, a functional element of the Institute of Food and Agricultural Sciences (IFAS) of the University of Florida, located at Gainesville. He joins an interdisciplinary group of both University and USDA personnel who are jointly cooperating in research concerned with controlling aquatic weeds. His research will be oriented towards the development and implementation of an integrated approach to noxious aquatic weed control, incorporating biological, chemical, and mechanical means.

Dr. Batterson received his B.A. in Biology from Western Michigan University and his M.S. and Ph.D. degrees in Aquatic Ecology from Michigan State University. During his graduate program he served as both a teaching and research assistant. Teaching responsibilities included involvement with courses taught on campus as well as at the Kellogg Biological Field Station. As a research assistant he was actively involved in a variety of projects concerned with the aquatic environment.

Dr. Bruner and Dr. Van Join Aquatic Plant Management Lab Staff

Drs. Marc C. Bruner and Thai K. Van are joining an interdisciplinary team at Ft. Lauderdale made up of USDA and University of Florida scientists who are cooperating in research concerned with management of aquatic weeds.

Marc recently completed his doctorate at the University of Tennessee, with research concerning the interactions of Eurasian watermilfoil and the sediments in a Tennessee Valley Authority reservoir. Growing up in Wisconsin, Marc received his B.A. and M.S. degrees from the University of Wisconsin-Milwaukee.

His primary responsibility will be concerned with ecological physiology, particularly how the nutrient status of hydrilla and water hyacinth influences the effectiveness of control techniques.

Prior to coming to Ft. Lauderdale, Thai worked as an assistant professor in aquatic weed science with the Aquatic Weed Research Center, University of Florida, Gainesville.

Thai's research will be oriented towards the development and implementation of an integrated approach to noxious aquatic weed management with an emphasis on chemical control techniques. He recieved his Ph.D. degree in Agronomy in 1975 from the University of Florida. Thai is married to Mai. They have two children, Annie, age 8, and Tina, age 6.

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