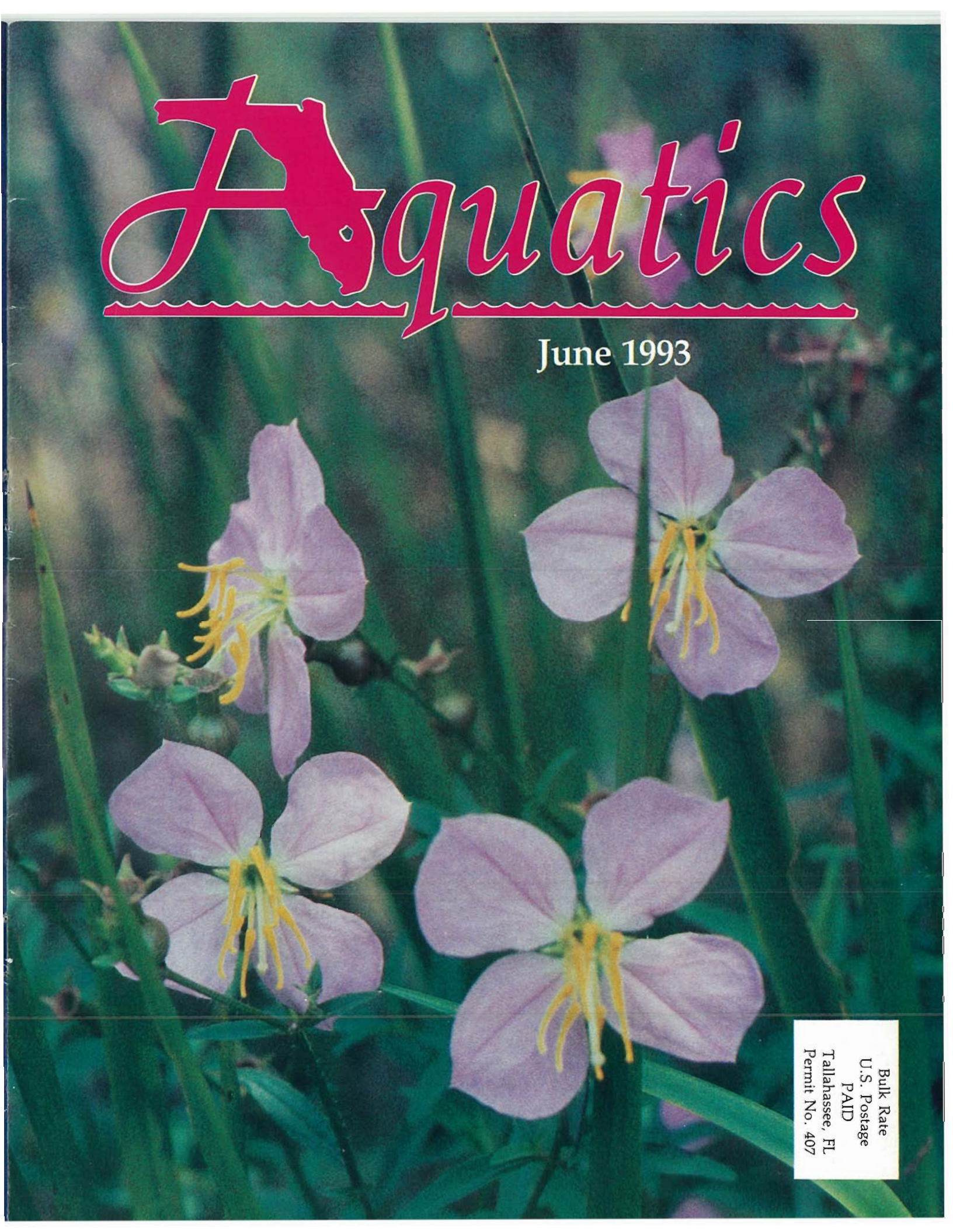

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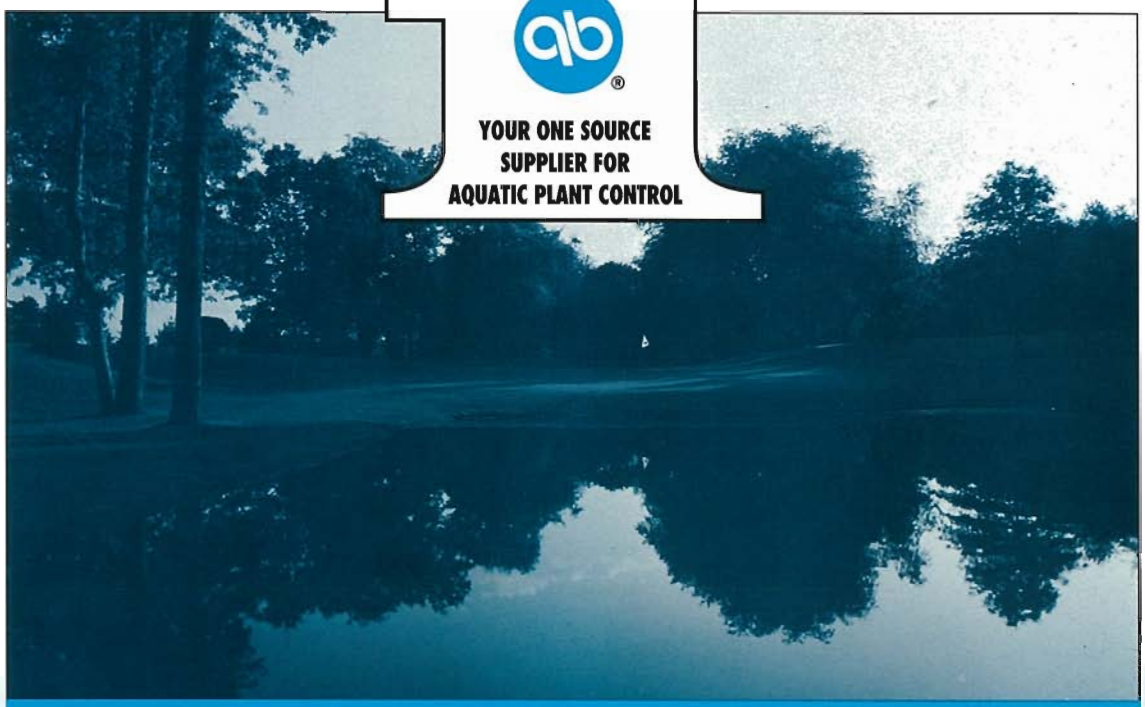

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Letter to the Editor

In the movie "Animal House," the statue of the fictional Faber College founder was inscribed with the works "Knowledge is Good." Recent [and not so recent] media publicized events may be telling us that knowledge alone is not good enough. Communication is equally or more important than knowledge alone.

In early 1993 the Journal of the National Cancer Institute published a study suggesting that women with high exposures to DDT may be four times more likely to develop breast cancer. This could be the initial salvo in the war to eliminate synthetic pesticides and fertilizers from everyday use. Never mind that the minute chances of developing cancer are far outweighed by the direct benefits enjoyed, such as greatly reduced deaths from vector-transmitted diseases. I had a professor during my stint in graduate school who liked to ask which we would prefer, probable death before age 30 from malaria or possible death at age 60 from cancer.

In aquatics we are continually condemned through the media for our use of herbicides in aquatic plant management. "Herbicides add to the pollution brew. They are used to control aquatic vegetation for navigation and aesthetic reasons and have contributed significantly to fish kills in Florida. . . .." (Living Waters: A Special Report on Florida Waters, Bassmaster magazine, December 1992). Too many people forget or have never experienced the problems, including destruction of fisheries habitat, associated with unmanaged aquatic vegetation.

In 1905 George Santayana said "those who cannot remember the past are condemned to repeat it." It is incumbent upon those of us who depend upon pesticides as tools of our trade to remind people of the horrors of the past and how pesticides have helped to bring about the quality of life we enjoy. Communication.

Edward J. Kertis, Jr.
MS, Environmental Engineering Sciences

About The Cover
An attractive array of color is displayed in our wetlands. Do you recognize this species?

Aquatics
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Catclaw Mimosa in Florida

by

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Kenneth A. Langeland[2]
and
Robert L. Kipker[3]

Introduction

Catclaw mimosa (*Mimosa pigra* L.), a native of Central America, was introduced in Florida probably through the ornamental plant nursery industry in the early 1950's. Catclaw mimosa, or giant sensitive plant as it is also sometimes called, is unique in that its leaves close (fold together) rather quickly when touched (Figure 1), exhibiting an animal-like response that is a novelty among plants. For this reason, catclaw mimosa has been introduced in many countries as a botanical curiosity.

Incidental spread of catclaw mimosa may occur through transport of its seeds or soil containing seeds. Catclaw seeds are covered with hairs (Figure 2) which create a way for dispersal by allowing seeds to attach to moving objects. Since the plant is native to Mexico, catclaw mimosa seeds could have become attached to clothing, cloth bags, etc., and transported to Florida by traffic coming from Mexico.

No direct evidence is available to suggest the manner in which catclaw mimosa was introduced in Florida. However, its presence near old ornamental plant nurseries in the Jupiter and Avon Park areas suggest catclaw mimosa was introduced as a novelty plant.

Figure 1.a. Catclaw mimosa plants prior to being touched.

b. Leaves fold quickly after being touched.

Description of Species

The genus *Mimosa* contains 400 to 500 species found chiefly in Central and South America. Catclaw mimosa was first described by Linnaeus in 1759 who named the plant after a pig because he thought its leaves closed slowly "like a pig". Actually, its leaves close rather quickly, but the name has remained.

A recent examination of plants similar to catclaw mimosa suggest that plants in Florida may be incorrectly named *Mimosa pigra*. The correct name for catclaw mimosa may be *Mimosa pellita* Humboldt & Bonpland ex Willdenow of which there are three varieties, var. *pellita*, var. *dehiscens* Barneby, and var. *hispida* (Willdenow) Barneby. In this article, however, we will continue to make use of the scientific name of *Mimosa pigra* for plants commonly named catclaw mimosa.

Distinguishing Field Characteristics

Distinctive field characteristics of catclaw mimosa include: sensitive, even bipinnately compound leaves (Figure 1a), recurved thorns on the stem, petiole, and leaf rachis, and straight spines at the junction of leaflets (Figure 3), pink flowers arranged in a head and extended on a stalk from the stem (Figure 4), clusters (hands) of flat brown pods (fingers) each with transverse sections held by sutures, and single seeded sections of the pod with golden hairs scattered on the surface which break from the fingers, leaving an empty frame (Figure 2).

Seed Germination and Growth

Mature catclaw mimosa seeds, which drop from the fingers, are buoyant and can float for a period of time. While seeds may travel with water currents, infestations in Florida are more likely to experience inundation rather than actual flowing water. This lack of contact with flowing water probably has reduced wide spread dispersal of catclaw mimosa as compared to other countries. In Florida, seedlings most often occur directly under the parent plant.

Although we have found that catclaw mimosa seeds will germinate underwater and produce one set of true leaves, they will not continue growth unless emersed.

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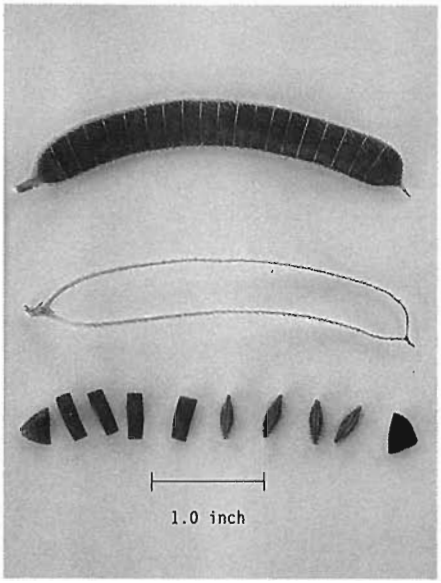

Figure 2. Catclaw mimosa seeds.

In Australia, seeds have been found to float for a month, but in our studies, we have found that seeds will sink within 10 days of being placed on the surface of water. If catclaw mimosa plants were to gain access to the Everglades, then water in this wetland system would provide a major opportunity for dispersal of seeds. The wet and dry hydrologic cycle in south Florida may provide ideal conditions for germination of catclaw mimosa seeds and subsequent growth.

Catclaw mimosa produces seeds year round in the tropics and in Florida. A mature plant may produce 42,000 or more seeds a year, although in Florida, annual seed production per plant is probably much less due to poor soil fertility and heavy plant competition. Also, it appears that flowering and seed set are inhibited by shading.

Catclaw mimosa plants in Florida contain on average 4.5 fingers per inflorescence and 19.1 seeds per finger. A well fertilized plant in a Broward County golf course site had one hand with a cluster of 34 fingers. A mature seed weighs 0.32 ounces. Ripe seeds develop within about 5 weeks of flowering, but seeds remain viable for many years while young seeds have a higher germination rate than older seeds.

Once established, catclaw mimosa can withstand almost total submergence by readily forming adventitious roots and corky tissue along its stems. Plants grow best on well fertilized, disturbed sites in full sun but they may also be found growing on a variety of soil fertility levels. In infested areas, catclaw mimosa are causing problems by growing mixed with crop plants and pasture grass.

Known Locations of Catclaw Mimosa in Florida

Catclaw mimosa was first identified in 1953 from plants collected in Okeechobee and Palm Beach Counties. As of 1993, catclaw mimosa plants have been identified growing in Broward, Palm Beach, Martin, St. Lucie, and Highlands Counties in Florida. All the plants on the St. Lucie River and a Broward County golf course are under control. Catclaw mimosa plants growing in Palm Beach, Martin, and Highlands County are the most persistent and entrenched. We have received unconfirmed reports of seedlings of catclaw mimosa being sold by a roadside vendor in Broward County and at flea markets in Broward and Palm Beach Counties.

Although large populations of catclaw mimosa are not present in Florida, the plant poses a serious threat to the Everglades wetland ecosystem. The formation of adventitious roots and corky tissue along stems of flooded plants may allow catclaw mimosa to colonize wetland areas in south Florida at the expense of native aquatic plants as experienced in other countries.

Potential for Problems

Catclaw mimosa has spread in agricultural, wetland, and riverine communities in tropical regions of the world, and is particularly troublesome in several countries where it has naturalized. It was introduced into Thailand in 1947 as a cover crop and for erosion control, and since that time, catclaw mimosa thickets have increased to the point where they are causing flooding along rivers and irrigation systems by obstructing water flow

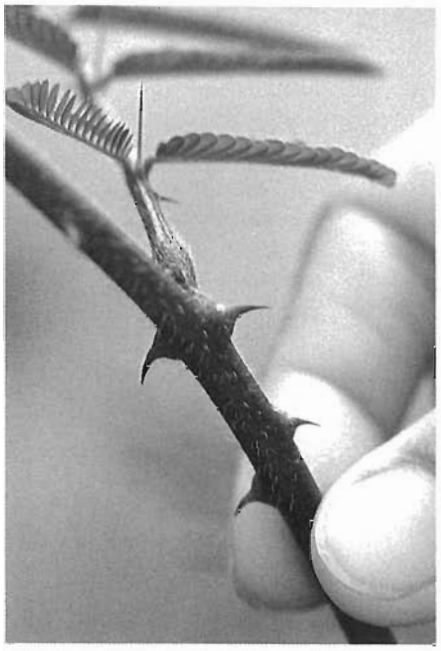

Figure 3. Recurved thorns are present on stems and straight spines on leaflets of catclaw mimosa.

and increasing sedimentation. Lack of control would wipe out whole agricultural areas in a few years. By contrast, catclaw mimosa was discovered in Florida at about the same time as in Thailand, but has yet to make it's presence felt. Over 100 years ago, catclaw mimosa was introduced in Australia, but it wasn't until the past 20 years that this plant became an aggressive weed in some areas of the country, rapidly replacing native plant species and competing with cultivated species. Because of its weedy nature, catclaw mimosa is included on the federal noxious weed list (7CF, Part 360) published by the USDA/APHIS Plant Protection and Quarantine Program (PPQP), and is listed as a prohibited aquatic plant by the Florida Department of Natural Resources.

Control of Catclaw Mimosa with Herbicides

Foliar applications of herbicides are generally the most effective method for controlling catclaw mimosa. Repeat treatments are usually necessary because of the sprawling growth habit of these plants, which makes it difficult to obtain complete coverage of the herbicide.

Clearly, it just makes good sense to be careful when controlling aquatic weeds!

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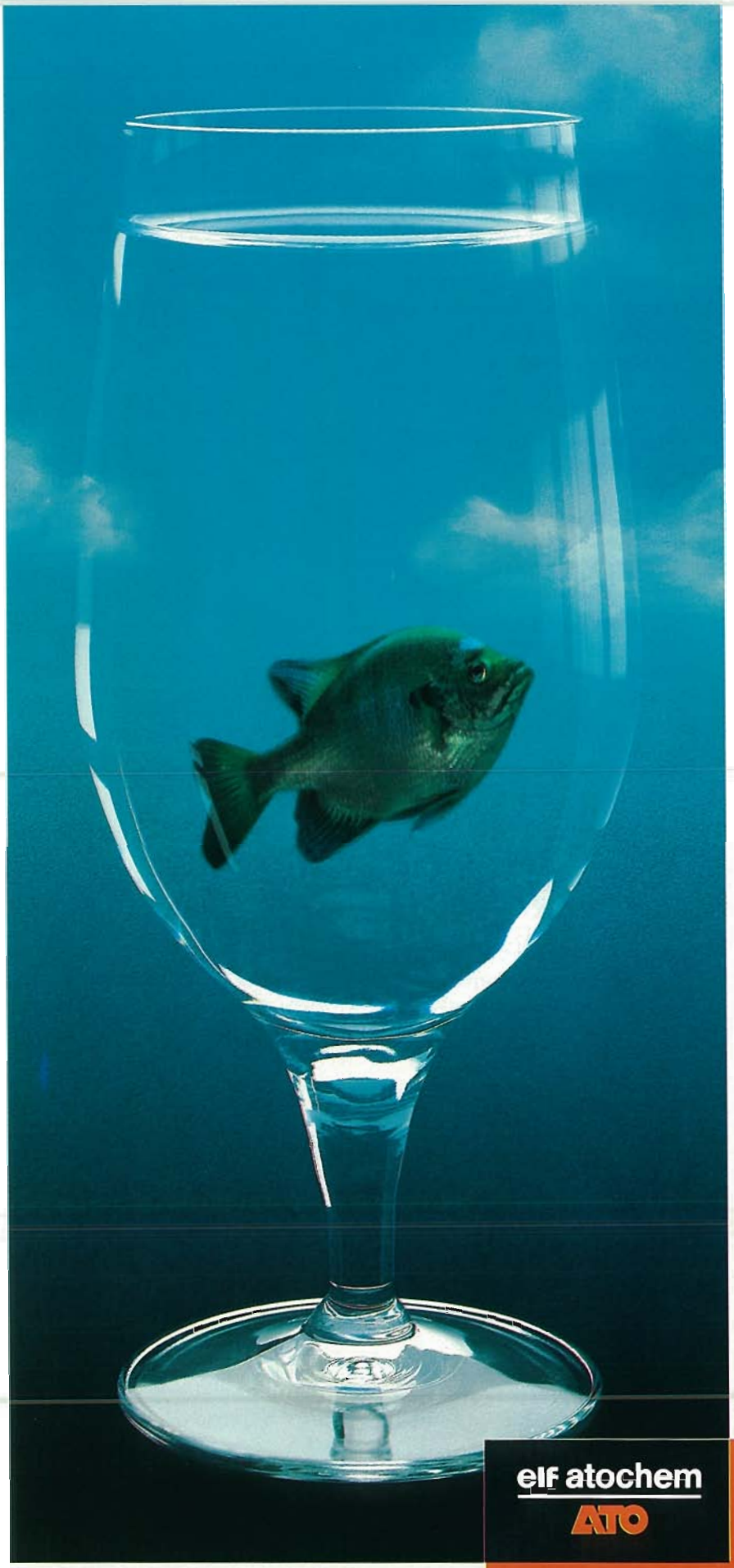

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Catclaw mimosa usually starts growth in the under story of a plant thicket, then grows to the top and spreads out in the sunlight. This competing vegetation interferes with survey and herbicide application efforts.

Studies with herbicides at label rates in south Florida have shown that soil applications of Spike® 40P (tebuthiuron), and foliar applications of Transline® (clopyralid), a broadleaf specific herbicide, will provide excellent control of catclaw mimosa. One advantage of using Transline® is that it kills only catclaw mimosa and does not affect most surrounding plants. In many situations catclaw mimosa grows entwined with other plants making it difficult to spray the catclaw mimosa without getting herbicide on non-target plants. Transline® is not currently registered in Florida but we are in the process of applying for a Special Local Need Registration (24C).

Since most seedlings have been found to germinate under the parent plant, soil treatments with Spike in the seed fall area will probably affect most of the dropped seeds. Land use in most infested locations, however, prevents use of Spike because this herbicide is soil active and kills a broad spectrum of plants.

Foliar applications at label rates for Rodeo (glyphosate), Garlon 3A (triclopyr), and Banval 720 (dicamba) generally require repeat applications to ensure complete kill of catclaw mimosa plants. Small plants are more easily killed than large plants.

Control of Catclaw Mimosa with other Methods

Manual cutting or burning, or a combination of these methods, will temporarily control the spread of catclaw mimosa but rapid regrowth reduces the effectiveness of these methods. Furthermore, incomplete burning tends to stimulate seed germination and new plants will readily sprout from cut stumps. Young seedlings may be removed by pulling.

Biological controls with plant pathogens and insects are being researched in other countries, but are not presently available for use in Florida.

Figure 4. Pollination of a catclaw mimosa flower by a bumblebee.

Several legume feeding insects have been found on catclaw mimosa in Florida. The extent to which these insects affect growth of the plants is unknown. However, we have noticed feeding activity by several insects on seeds which may reduce the seeds' viability and number available to germinate.

The Florida Department of Natural Resources (DNR), Bureau of Aquatic Plant Management has been involved in the survey and control of catclaw mimosa since 1985. The USDA/APHIS/PPQP has assisted these efforts through funding and manpower during these surveys and herbicide spraying. Present control efforts are concentrating on preventing the spread of catclaw mimosa while reducing the number of plants and preventing seed production through herbicide treatments conducted by a private applicator company. Florida DNR, University of Florida/IFAS, and USDA/APHIS/PPQP are presently in the process of developing and implementing a plan that hopefully will eventually eradicate catclaw mimosa from the State of Florida.

Eradication of Catclaw Mimosa

Eradication of catclaw mimosa is essential to prevent its spread in Florida. Florida's experiences with other exotics, such as melaleuca (*Melaleuca quinquenervia* Blake), have shown that some plants, not normally considered aquatic species, may adapt to wetland conditions and replace native species essential to the unique wetland ecosystems in south Florida.

Eradication of catclaw mimosa in Florida appears to be an attainable goal. Growth and spread of catclaw mimosa in Thailand and Australia illustrates the noxious nature of this plant and the problems it can cause once it becomes the dominant species in an area. Since known populations in Florida are low in number of plants, an eradication program consisting of (1) surveying for new plants, (2) removal of flowers and seeds from mature plants, (3) application of herbicides to all

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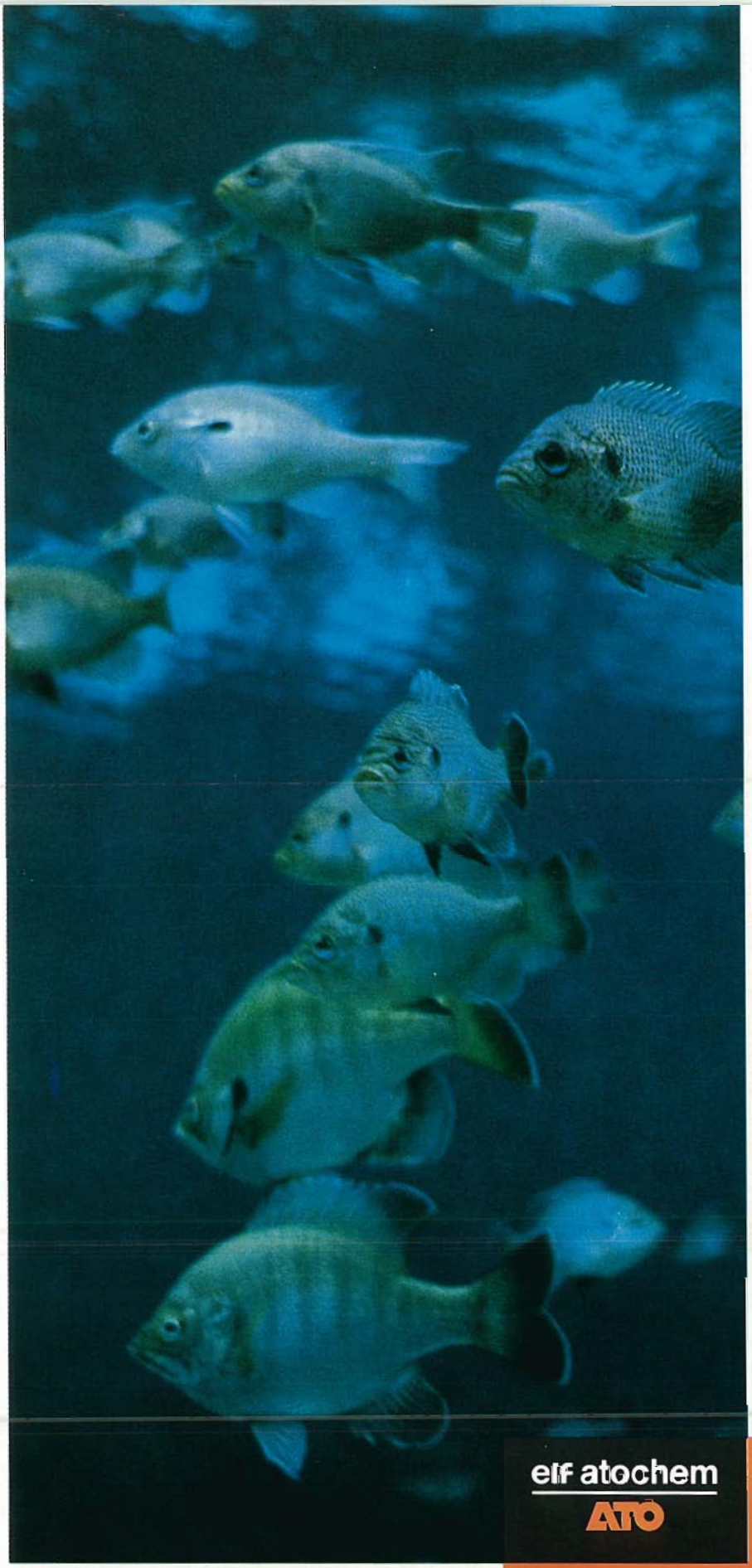

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existing plants, and where applicable, hand pulling to remove seedlings and young plants, and (4) monthly surveys to ensure no growth of seedlings is one approach to ensure no new catclaw plants will survive.

An important part of the eradication program is to inform the public of the dangers of catclaw mimosa to help find isolated plants that may have been planted for their botanical curiosity.

Herbicides are the most practical method to eradicate catclaw mimosa plants in Florida. Based on ecological studies and herbicide trials, and the number of known infestations, a two-person team working full time surveying and spraying every site once a month should be adequate to eradicate this plant in Florida. A year-round once-a-month schedule is required because catclaw mimosa plants have been found to flower all year, and only about 5 weeks are required from flowering to seed set. Surveying and spraying will need to continue until the seed bank is depleted, approximately 10 years. Successful completion of this eradication program will eliminate the threat of catclaw mimosa becoming a major weed problem in Florida.

Acknowledgements

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Additional Reading

Anyone interested in additional information on catclaw mimosa may want to consider the following publications:

Harley, K. L. S. 1992. (Ed.). A Guide to the Management of *Mimosa pigra*. International Workshop, Darwin, Australia, May 11-15, CSIRO, Canberra, 121 pp.

Nall, L. E., Gilbert, K. M., and Kipker, R. L. 1986. Survey and control of *Mimosa pigra* with a review of it's biology. Florida Dep. Nat. Res., Bureau of Aquatic Plant Management, Tallahassee.

Sutton, D. L. and K. A. Langeland. 1992. Assessment of *Mimosa pigra* Eradication in Florida. Final Research Project Report Submitted to the Florida Department of Natural Resources, Bureau of Aquatic Plant Research and Control, Tallahassee. 121 pp.

Reporting Catclaw Mimosa Plants

Any person who suspects catclaw mimosa may be growing in Florida needs to contact: DNR Regional Biologist for south Florida, (407/793-5666); University of Florida, IFAS, Center for Aquatic Plants (904/392-9613); Fort Lauderdale REC (305/475-8990); or DNR, Tallahassee (904/488-5631) so the plants can be identified and destroyed if found to be catclaw mimosa.

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Working To Enhance Our World

Aerial Application Considerations

by

Brian V. Nelson
South West Florida Water Management District

Introduction

As a result of better statewide organization, adequate funding and the adoption of the maintenance control concept, aerial water-hyacinth control operations have become somewhat of a rarity on most public lakes and rivers. However, due to the continuing expansion of hydrilla to more and larger waterbodies, the need for aerial application will most likely increase. Hydrilla currently occurs in about 40% of Florida's public waters.

When manpower or time is limited and a large treatment required, aerial application is often the only feasible alternative. For example, Highlands County, with two field crews, recently had the large job of treating 2,400 acres of hydrilla on the 27,000 acre Lake Istokpoga in addition to maintaining twenty-seven other waterbodies within their county. The 2,400 acres was treated by helicopter in less than twenty hours of flight time. Aerial applicator's also feel that they can provide a more consistent application over large treatment areas.

Aerial application does have drawbacks, as anyone who has supervised these operations can attest. Depending on the equipment used and the experience level of the pilot, the ability to control herbicide placement can vary. Aerial application also involves the coordination and movement of a lot of equipment, herbicide, and people so there is less flexibility to conduct treatments when weather conditions are optimal. Because most aquatic plant managers do not possess aerial application equipment they have to rely on contractors who may not be familiar with the area to be treated.

The decision to utilize aerial application should be based upon the careful consideration of several factors. Can the treatment be successfully completed with existing manpower and equipment? Can you contract crews and equipment to complete the job without falling behind on other tasks? Does the treatment have to be completed within a certain schedule, which is not possible utilizing other techniques? Will aerial application save money when compared to other techniques? And most important, can the operation be successfully conducted using aerial application? Aerial application is not normally the method of choice for conducting spot treatments or controlling plants intermixed with beneficial vegetation when the herbicide utilized will also impact nontarget species.

While a recent aerial application experience was fresh on my mind, I thought it would be helpful to list some considerations which may assist others who have to plan or supervise a similar operation.

Planning

1. Prepare a detailed map and treatment plan with the treatment areas or plots clearly marked and numbered. The herbicide and rate to be applied should also be indicated.

2. Locate loading area or areas. Good sites will be close to the treatment areas and not have any overhead obstructions. Grass or paved areas are best, sandy areas should be avoided. Areas with limited public access will help to avoid the potential for injury to spectators.

3. Arrange to have equipment which can transport a large amount of herbicide to the loading area and to remove the empty containers and packaging.

4. Mark the treatment areas or plots so that they will be clearly visible to the pilot. Aerial applicators have indicated that white or orange markers show up best.

supervisor at the loading area is important should any problem arise.

4. Mix only the minimum amount of herbicide necessary to keep the operation running smoothly. Equipment failure or changing weather conditions can delay or cancel a treatment and the remaining mix may have to be stored, transported and possibly agitated until the operation can resume. Do not mix any of the herbicide until the decision to proceed has been made.

5. Make sure to have plenty of the safety equipment required by the product label for mixers and loaders as many persons may be involved in mixing or loading herbicides and disposing of the empty containers.

6. Determine when, where and how empty containers will be triple rinsed because the loading site may not be within the treatment area or even on the waterbody being treated.

Operations

1. An aerial treatment on a public waterbody will generate attention. A public meeting and/or newspaper article to provide information in advance of the operation is helpful. Information such as the purpose and goal of the treatment, the anticipated impact on non-target plants and animals and water use restrictions, if any apply, should be discussed.

2. Prior to beginning the operation, the treatment plan should be reviewed with the pilot, boat operators, and the persons loading the herbicides to insure that everyone involved is familiar with the plan and knows what they are supposed to do. Any special precautions should be reiterated at this time.

3. At least one, if not two boats should be on the water to clear fishermen and other boaters from the treatment areas. The boats are also important to assist the pilot in locating the correct treatment area and to directly monitor the application technique. Radio communication between the boats and the

5. It has been my experience that it is tempting to try and complete an operation once it has begun even when weather conditions become less than optimal. Remember, the goal of an aquatic plant manager is not to complete an aerial application, but to successfully control the target vegetation. Postpone the treatment if weather conditions become unacceptable.

6. Keep track of the amount of herbicide being used and the acres treated to insure that the specified rate is being applied.

7. Have enough personnel on hand, especially during pellet applications, to move, load and dispose of a large number of herbicide containers. Empty containers and cardboard packaging can be blown about the loading area by the helicopter unless properly secured. A large capacity dump truck or similar vehicle can easily store and haul away empty containers and packaging. Plastic bags are handy for containing and disposing of cardboard, lids and other packaging.

8. Have a shovel and absorbent material on-site to quickly clean up any minor spills which may occur within the loading area.

Aerial application gives aquatic plant managers the ability to treat large amounts of vegetation in a short amount of time. This ability can quickly magnify small problems into large ones. Additional preparation and caution is warranted in planning an aerial application and selecting a competent applicator if the desired results are to be achieved.

CERCOSPORA RODMANII Released in Africa

IFAS Professor R. Charudattan (Charu) informs us that *C. rodmanii*, a leafspot fungus, which has been evaluated for biological control of waterhyacinth in North America, has been released as a classical biological control agent in South Africa.

This is the first deliberate and authorized release of a foreign pathogen against waterhyacinth anywhere in the world. The released fungus is native to Florida and is the same strain that Charu has used in his work for a number of years.

Eichhornia spp.
Waterhyacinth

Charu has said over the years that *C. rodmanii* has a genuine role in the biological control of waterhyacinth and is hopeful that it will have a successful impact on waterhyacinth in South Africa. *C. rodmanii* appears to be more virulent and potentially a more effective biocontrol agent than the closely related *C. piaropi*, another leafspot fungus, recently discovered on waterhyacinth in South Africa.

Maintenance Control of Hydrilla in the Winter Park Chain of Lakes, Florida

by

Pierre Deschenes, Lakes Chief
City of Winter Park
and
Judy Ludlow, Biological Scientist
Department of Natural Resources

Introduction

Management of hydrilla (*Hydrilla verticillata*) in the Winter Park Chain of Lakes in Central Florida has a long and interesting history. Hydrilla has plagued up to 90% of the Winter Park chain of lakes since the early 1960's. Efforts to manage hydrilla in the chain began in earnest in the mid 1960's and continues today. Based on the data presented below, we believe these management efforts have resulted in the lowest feasible levels of hydrilla.

Description of Lakes

The six lakes of the Winter Park chain lie within the boundaries of the City of Winter Park, the City of Maitland, and unincorporated Orange County, Florida. The Winter Park chain is part of a larger 21-lake system which begins in downtown Orlando and continues northward to the St. Johns River. The Winter Park chain of lakes has a total surface area of 1008 acres and is made up of Lake Maitland (451 acres), Lake Osceola (157 acres), Lake Virginia (235 acres), Lake Minnehaha (96 acres), Lake Mizell (62 acres), and Lake Nina (8 acres). The watershed of the Winter Park chain is highly urbanized. Water quality data from the Florida Lakewatch program at the University of Florida, and the Orange County Environmental Protection Department indicate a meso-eutrophic system. Lake uses of the Winter Park chain are varied and include pleasure boating, skiing, sailing, and fishing.

Hydrilla was first noted on the Winter Park chain in the early 1960's and anecdotal evidence indicates that hydrilla has impacted up to 90% of the chain. Historically, lakes Maitland and Minnehaha have had the worst hydrilla infestations followed by Virginia, Osceola, Mizell, and Nina. The 1983 Department of Natural Resources (DNR) aquatic plant survey estimated 500 acres, or 50% coverage of hydrilla on the Winter Park chain of lakes (Figure 1). Lake Maitland was the most heavily impacted with approximately 70% hydrilla coverage.

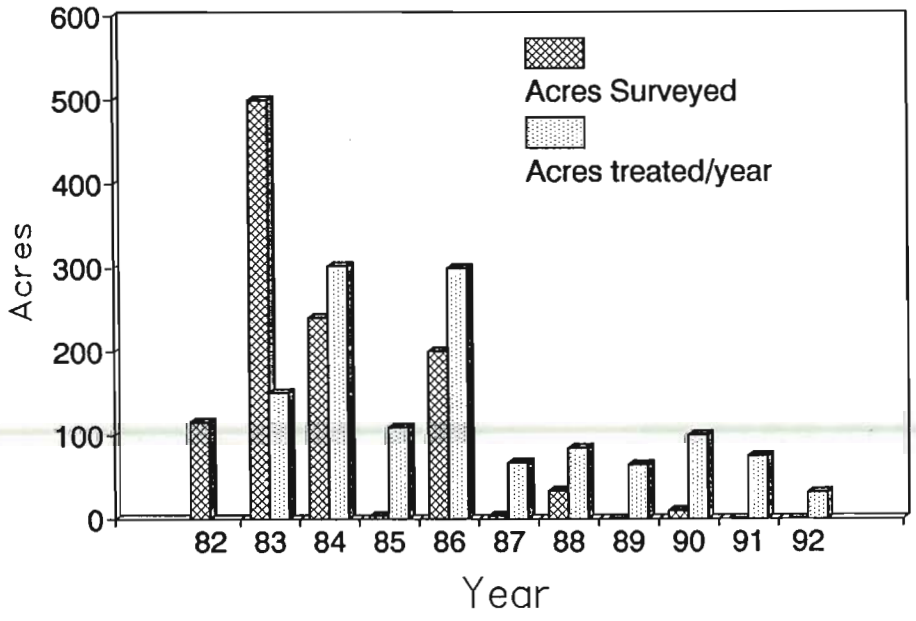

Figure 1. Maintenance control of hydrilla in the Winter Park Chain of Lakes has resulted in very low levels of hyedrilla and fewer acres treated per year

Management Program

In 1966 the City of Winter Park began managing hydrilla with aquatic plant harvesters. Even with three harvesters working full time, hydrilla continued to expand and could not be effectively controlled. In 1970, Winter Park started experimenting with herbicides under the supervision of Bill McLintock. Hydout, Aquathol-K, Diquat with chelated copper, and Hydrothol-191 were used from 1970 to the early 1980s. Large-scale treatments were generally conducted twice each year affecting hundreds of acres of hydrilla.

Winter Park began using the herbicide Sonar in 1983 under an experimental use permit. During that year, 122 acres of hydrilla were treated with Sonar in lakes Maitland, Virginia, and Minnehaha. Contact herbicides were used in Mizell, Osceola, and Nina. From 1983 to 1992, hydrilla has been managed using both Sonar and contact herbicides. The amount of hydrilla treated has ranged from 300 acres in 1984 to 30 acres in 1992 (Figure 1.) with lakes Maitland and Minnehaha receiving up to 43% and 66% of the treatment acreage, respectively.

Based on available data, we believe that the City of Winter Park has achieved maintenance control of hydrilla. Maintenance control is defined as a method for the management of aquatic plants in which techniques are used in a coordinated manner, on a continuous or periodic basis, in order to maintain target plant populations at the lowest feasible level that funding and technology permit. Concurrently, expenditure of herbicide and associated funds needed to control target plant populations should also decline. Based on data from DNR aquatic plant surveys, hydrilla coverage in the Winter Park chain of lakes has declined from 500 acres in 1983 to 4 acres in 1987 and has remained below 35 acres (3% coverage) since 1988 (figure 1).

Hydrilla removal, Lake Virginia 1968.

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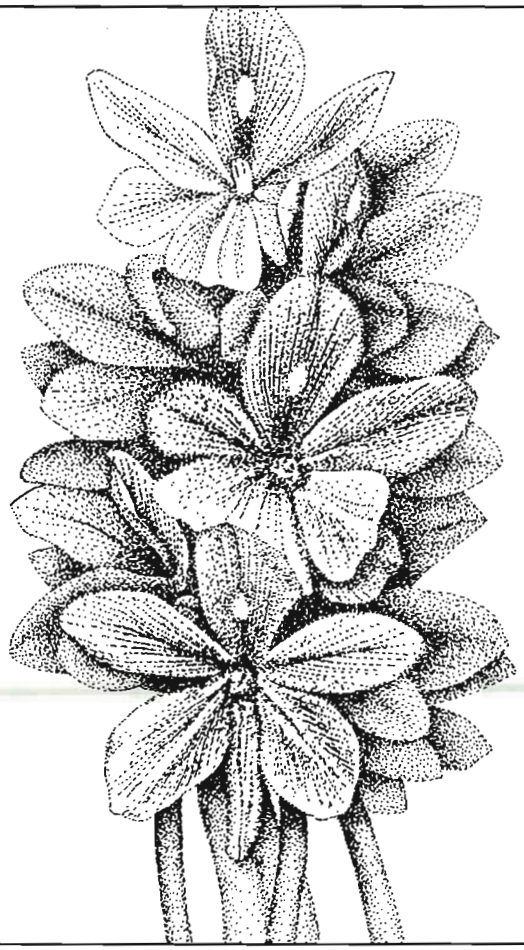
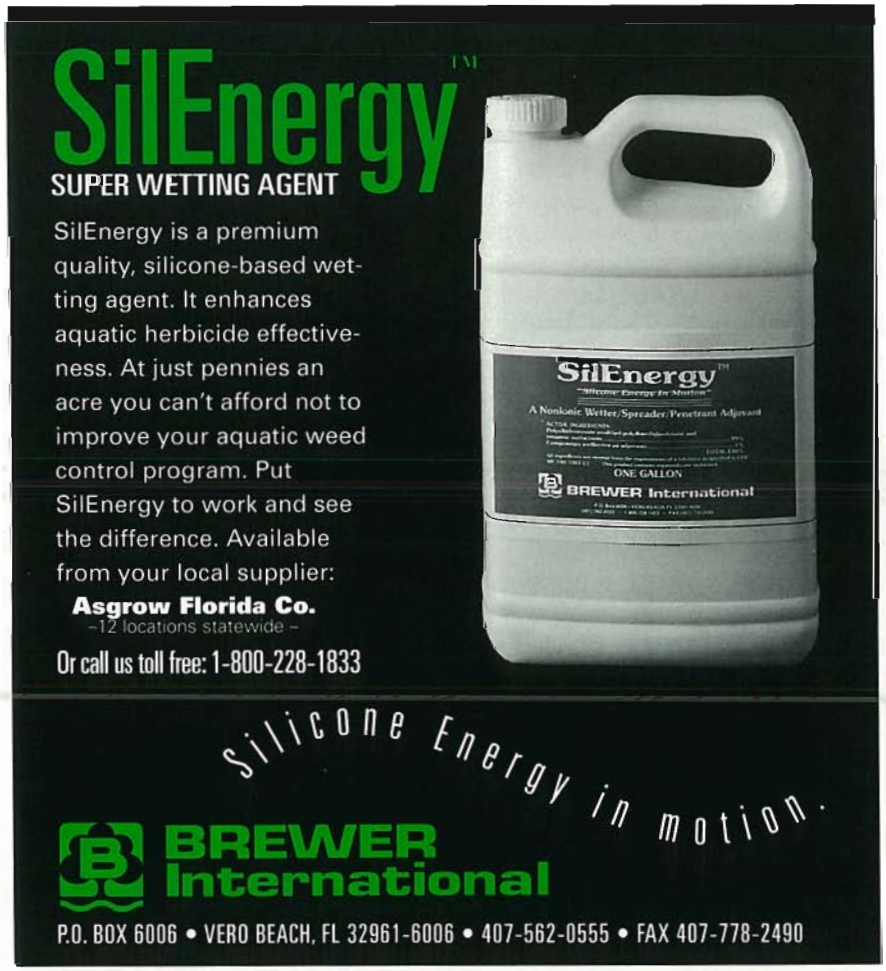


Hydrilla, Lake Osceola 1968

Subsequently, the amount of herbicide used and the dollars spent to manage hydrilla has also declined and remains consistently low. In 1984, Winter Park spent over $150,000 to control hydrilla. Since 1987 expenditures have remained below $50,000 and were as low as $15,000 in 1992. Based on these data we believe that hydrilla is under maintenance control in the Winter Park chain of lakes.



Achieving maintenance control of hydrilla on the Winter Park chain of lakes can be attributed to several factors. The lakes are relatively small, water flow is usually insignificant, and hydrilla populations are usually easy to find, treat, and monitor. Additionally, Winter Park has 7 full-time employees dedicated to lake management. As a result, the lakes are intensively monitored and new hydrilla populations are controlled as soon as they are discovered. Because hydrilla has been under maintenance control in the chain since 1987, other submerged aquatic plants such as pondweed (*Potamogeton Illinoensis*), southern naiad (*Najas guadalupensis*), nitella (*Nitella spp.*), eelgrass (*Vallisneria americana*), and chara (*Chara spp.*) have rapidly expanded. In fact, pondweed coverage has increased to the point where some measure of its control is now necessary.

Because of interagency concerns and the multiple use nature of the Winter Park chain of lakes, discussions on how to best manage hydrilla have not proceeded without debate. During the mid 1980's state and local agencies discussed the option of using triploid grass carp to reduce management costs. Winter Park strongly opposed the use of grass carp due to concerns over the possibility of impacting non-target aquatic plants. Because of this opposition and other factors such as initiation of a program to replant the shoreline and successful attempts to reestablish submerged species, grass carp were never officially introduced into the Winter Park chain of lakes.

The progression of techniques used to suppress the growth of hydrilla in the Winter Park chain of lakes generally reflects the history of hydrilla control in Florida. It has taken 20 years of intensive management to achieve the level of control now sustained in the chain. The control of hydrilla in the Winter Park chain will continue to evolve as new strategies are developed to maintain hydrilla at lowest possible levels.

Evaluation of the FISCAN® Plug for Melaleuca Control

by

François B. Laroche
Staff Environmental Scientist
Vegetation Management Division
South Florida Water Management District

The South Florida Water Management District is responsible for managing over 860,000 acres of Everglades marsh. It is estimated that nearly half of this fragile ecosystem is infested with varying densities of melaleuca (*Melaleuca quinquenervia* Blake) . In recognition of the loss of natural communities caused by the aggressive invasion of melaleuca, the District has been actively involved in developing management practices for the control of this exotic plant. Management programs include manual removal, mechanical removal, physical controls and herbicides, alone or in combination. Biological controls are currently under study.

Melaleuca can survive indefinitely in standing water. For this reason, finding an acceptable and consistent method of control has been challenging. The choice of any method of control depends upon environmental conditions and degree of infestation. The FISCAN® plug injection system offers promise as an alternative control method for melaleuca. This system is comprised of a metal hammer with a replaceable core tip and a plastic plug containing 500 milligram of 90% soluble powder VELPAR® (hexazinone) herbicide (Figure 1). The hammer is used to create an opening on the side of the tree, and the plug is placed and hammered into the opening to rupture its side walls and force out the herbicide into the cambium layer (Figure 2-4).

On June 27, 1991 a representative from the manufacturer, Forestry Injection Company® (FIC), demonstrated the FISCAN® plug system to the District and treated 9 melaleuca trees. Evaluation of these trees after 6 months revealed successful control. Four of the trees were completely defoliated while the others were 60 to 70% defoliated with signs of stress and herbicide symptoms apparent. Consequently, the District proceeded to test the system on a larger scale.

Figure 1. The FIC® system includes a hammer, leather belt, holster, and a pouch. FISCAN plugs with VELPAR® herbicide sealed inside are sold separately.

A total of 3,350 melaleuca trees, along both sides of a 25 mile stretch of canal (L-67C) in Water Conservation Area 3, Dade county, Florida, were treated with the FISCAN® injection system in February of 1992. Herbicide applicators from Applied Aquatic Management, Inc., a contractor of the District, performed the work and monitored the test site. The applicators involved in this study had at least 2 years experience in melaleuca control with other injection methods (hack/squirt, basal/bark). Prior to the treatment, the applicators attended 2 hours of training on the use of the system. The FIC representative suggested the use of an elongated hammer-tip to enable better perforation of the thick bark of melaleuca trees. Airboats were used to ferry one of three applicators to each tree along the canal. Elongated hammer tips were used and plugs were placed at a rate of approximately one per 6 inches of tree circumference. On February 15, 1993 the contractor's applicators conducted a final evaluation of the site and have concluded the following:

Under ideal conditions the FISCAN® plug and hammer can work as effectively on melaleuca as other direct injection methods. Ideal conditions include easy access to the tree trunk, trunk diameter 3 inches or greater, and thin bark. Under these conditions one applicator can treat four times the number of trees compared to the hack/squirt method. The applicator must be able to swing the hammer for an effective blow to create a proper hole for insertion of the plug. After surveying the trees along the canal the applicators determined that 60% of the treated trees were effectively controlled. The remaining 40% were

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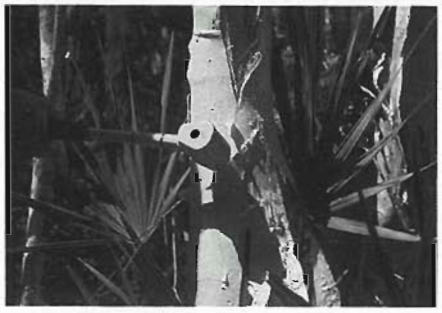


Figure 2. The FIC® hammer striking a melaleuca tree to create an opening for the FISCAN® plug.

Figure 3. The back of the hammer is used to pound the plug into the opening and rupture its side walls to force out the herbicide into the tree.

Figure 4. Fiscan plug inserted into a melaleuca tree.

either not affected or showed sign of stress and herbicide symptoms. According to the applicators these trees were unaffected because of their inexperience with the FISCAN® injection system. The plugs were either not placed properly or they were broken at the bark of the tree rather than in the hardwood.

The FISCAN® injection system offers several advantages over current control methods however, this system has some drawbacks.

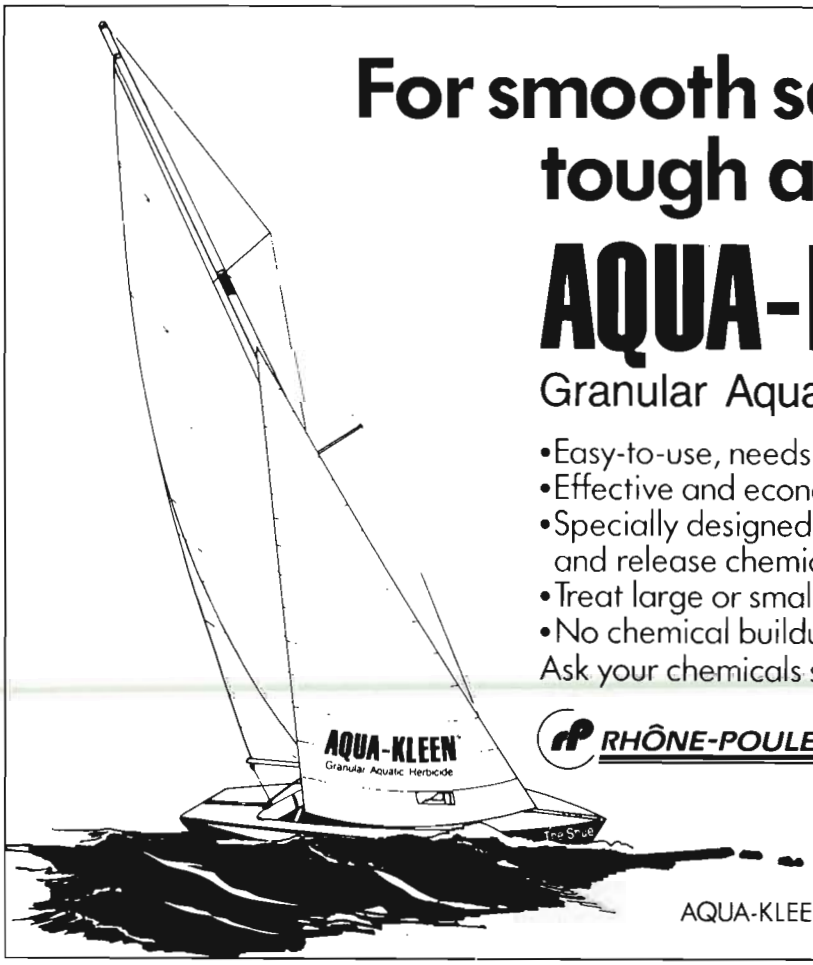
Advantages include:

1- The plugs are EPA labeled for use over standing water.
2- Herbicide exposure to the applicator is greatly reduced.
3- The Risks associated with handling of concentrated herbicides (spills), chain-saws, machetes, etc. are greatly reduced.
4- The method of application is faster and easier than other injection methods currently utilized.

Drawbacks include:

1- Trees under three inches in diameter can't be treated with the FISCAN® injection system.
2- In dense melaleuca stands it may be difficult or impossible to properly swing the hammer.

While the FISCAN® injection system along with other injection methods may not be cost effective in dense melaleuca stands, it does offer a suitable alternative for use in environmentally sensitive areas where standing water is present.



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Good targets for this system include but are not limited to large trees in urban areas and along canals and levees where accessibility is not a problem. However, some alterations may be needed to improve this system for melaleuca control. The core tip of the hammer should be elongated to provide effective penetration of the cambium layer through the thick bark of melaleuca. Also, other herbicides such as SPIKE® (thebutiron) and ARSENAL® (imazapyr) could be formulated into the capsules. These herbicides may increase the effectiveness of the system on melaleuca and other woody exotics. Overall, the FISCAN injection system has great potential for the control of woody exotics such as melaleuca in southern Florida.

Acknowledgement:
The author wishes to thank Robert Ledford and Jerry Renney of Aquatic Plant Management, Inc., for their help and assistance in this project.

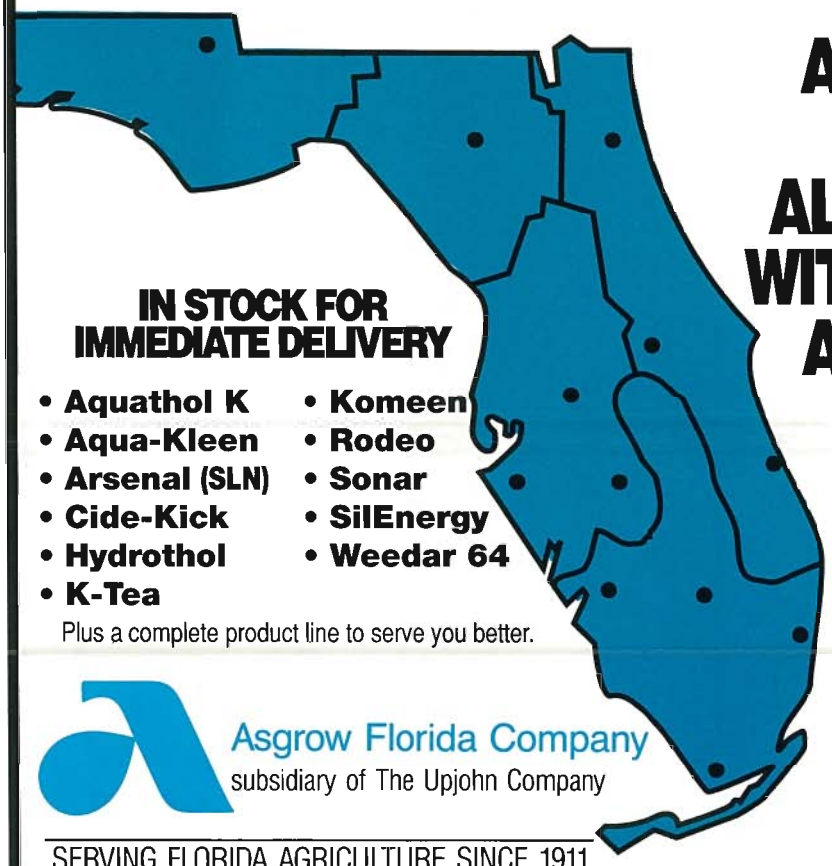
1993 FAPMS APPLICATOR PAPER COMPETITION

It's time to get the notebooks, pens, camera, and film out; and start preparing a paper for this years Applicator Paper Contest. We'll really have to go some to out-do the performance of last years winner, Joe Certain, but the competition gets better every year and I'm confident it will again this year.

"Handy Hints on How (and How Not) to Give a Talk" by Alison Fox in the June 1991 "Aquatics" is very helpful for preparing to give your presentation. If you need a copy of this article contact the Center for Aquatic Plants at 904/392-9613 (SC 622-9613).

Choose a topic now, make the commitment, and enjoy the fun in October. Here's some suggested topics: How your program is run. How you solved a difficult aquatic plant management problem. Natural history of an interesting aquatic plant. How an interesting aquatic animal, such as the Snail Kite relates to aquatic plant management. Innovative application equipment. Safety precautions you use, etc. Of course there are hundreds more ideas out there that I have never thought of. Anything that is related to better aquatic plant management and interesting to you will be interesting to your fellow FAPMS MEMBERS!

For additional information on this years Applicator Paper Contest contact Awards Committee Chairman, Brad Mann, at 813/763-2197.



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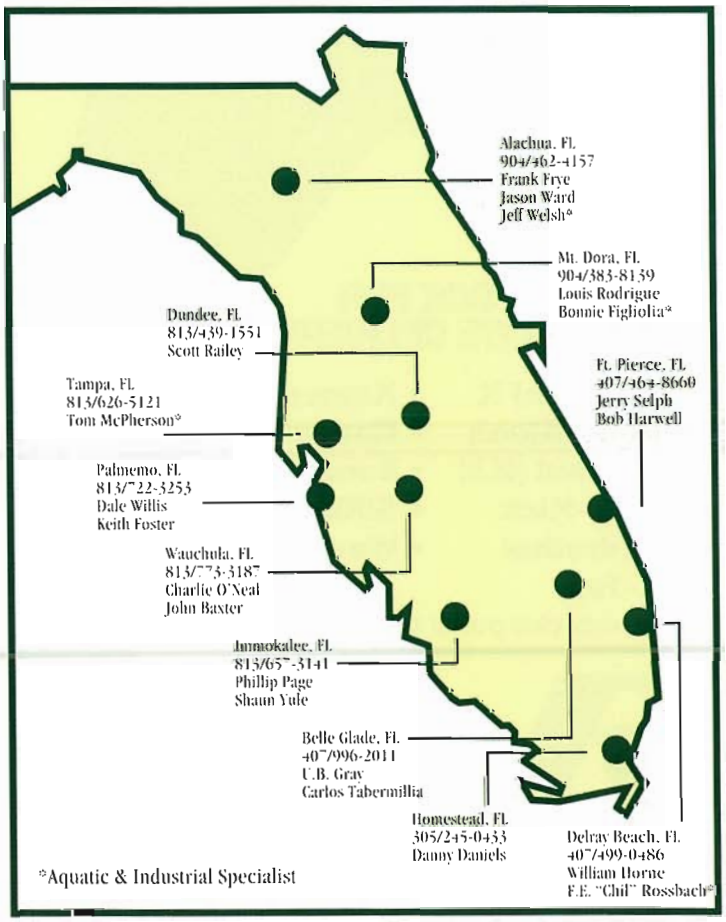


AQUAVINE

Still Moving On

After very briefly filling the new position with DNR as Environmental Specialist III on Lake Rousseau, Judy Ludlow has now moved on to Tallahassee to fill the position of Biological Scientist IV in the Contracts and Grants Section of DNR vacated by Brian Nelson.

Kathy Joins DNR Staff

Kathy Craddock Burks recently joined the staff of the Bureau of Aquatic Plant Management, Technical Services Section, in Tallahassee, as a Biological Scientist. Kathy's graduate training is in botany. Most recently, she has been a visiting researcher/field botanist with Tall Timbers Research Station and assistant curator of the Florida State University Herbarium. She is also consultant to the U.S. Forest Service and teaches botany-related short-courses at FSU. At the Bureau, Kathy will focus on herbarium research, plant identification services, and native-aquatic field studies.

Aquatics Inventory

We have the following back issues of Aquatics stored at the Center for Aquatic Plants in Gainesville:

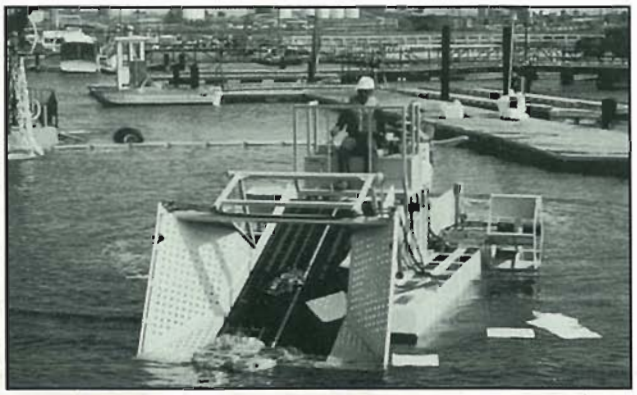
March 93 - 100s
June 92 - 70
September 92 - 40
December 92 - 150
December 91 - 100

If you'd like a handful to have available in your office or single copy to fill out your set, give us a call.

WSSA Extension Committee Requests your Assistance

The Weed Science Society of America Extension Committee is embarking on a project to get Weed Scientists and Weed Science members in the popular press in a formal light and get information to the general public. They have selected two short articles which they would like to get placed. One article, "Itch Season Returns" is based on poison ivy; the other, "Mean Green Hydrilla" is on one of our favorite topics.

If any member has contacts with large circulation, national publications such as boating, camping, recreation, health, water utility, gardening magazines, major chain store leaflet publishers, or others, please contact the WSSA Extension committee. They need lists of contacts for now and future. Contact: Walter Skroch, Chair, Extension Committee, NCSU-Box 7609, Raleigh, NC 27695-7609. Phone 919/515-3322, FAX 7749.



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FAPMS Members Honored

At their annual meeting in Zellwood, the Florida Weed Science Society named Ken Langeland as "Outstanding Weed Science Scientist of the Year."

At the Florida Lake Management Society annual meeting in Deland: Mark Hoyer was awared "Best Paper Award" for his paper the previous year titled "Relationships between Lake Trophic State and Wading Bird Abundance." Ken Langeland, Alison Fox, Bill Haller, Francois Laroche, Barbara Martin, Dean Martin, Charles Norris, and Chuhua Wang were awarded the "Groupee Award - for having the most co-authors on any paper ever presented at the annual meeting of FLMS." Dan Canfield was awarded the "Mark Twain Award" for his notable quote, "Engineers are people who like to work with numbers, but don't have the personality to be accountants." Dr. Canfield denies (memory of) making this statement.

Meetings of Interest

July 11-15, 1993
1993 Aquatic Plant Management Society, Omni, Charleston, SC. Steve DeKoslowski, 803-737-0800.

July 11-15, 1993
South Carolina APMS, Hosting APMS Meeting. Tommy Bowen, 704-875-5422.

Oct. 10-13, 1993
47th Annual Conference Southeastern Association of Fish and Wildlife Agencies

Oct. 12-14, 1993
Florida Aquatic Plant Management Society, Howard Johnson's, Daytona Beach, FL. Don Doggett, 813-694-2174.

Oct. 27-29, 1993
Midsouth APMS, Gulf Shores State Park, Alabama, Dr. Earl Burns, 205-386-3650.

Nov. 15-18, 1993
U.S. Army Corps of Engineers Aquatic Plant Control Program Annual Research Meeting, Baltimore, Maryland.

Nov. 30 - Dec. 4, 1993
North American Lakes Management Society, 13th Annual International Symposium on Lake and Reservoir Management. Lorraine Duncan, 904-462-2554.

July 1994
Aquatic Plant Management Society 34th Annual Meeting, San Antonio, Texas.

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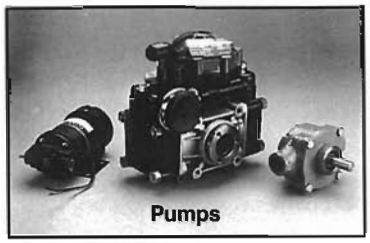
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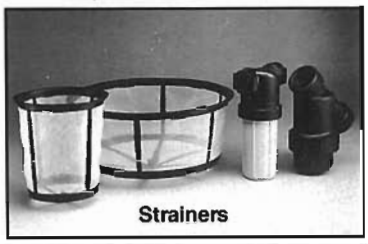
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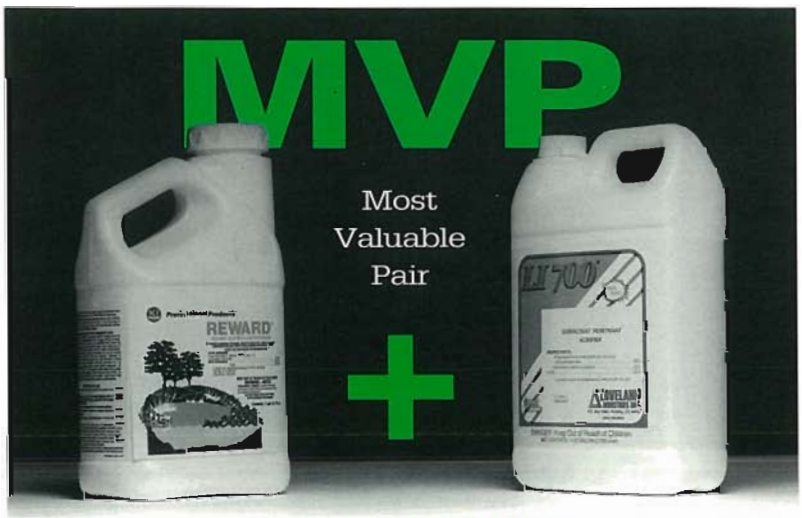

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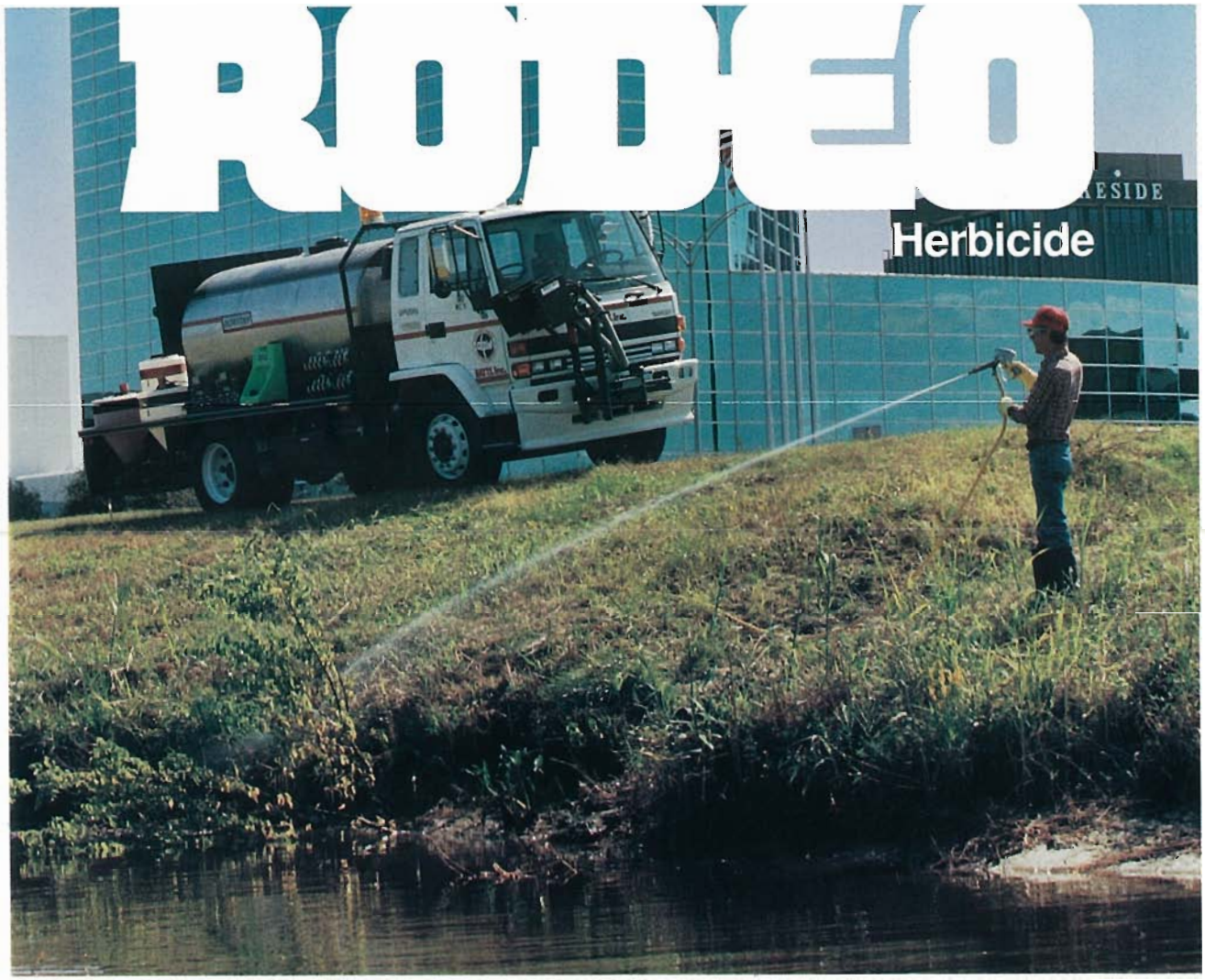
HOW TO CONTROL VEGETATION IN AND AROUND WATER.



When you have to control vegetation in and around water, Rodeo® herbicide is the answer to your needs. It's effective against a broad spectrum of emerged weeds, well-known for its environmental characteristics, and economical to use.

Rodeo works by entering a plant through its leaves, moving all the way down through the roots. Then it binds tightly to most types of soil particles. Therefore, you don't have to worry about it affecting the roots of desirable vegetation. This odorless herbicide is also non-volatile, which means it won't vaporize and move to non-targeted sites.

In addition, Rodeo helps you save time and money. That's because one application kills the entire plant. Unlike herbicides that temporarily burn down top vegetation, or mechanical methods that require expensive repeat visits, Rodeo gives you long-lasting results.

So when you need to keep aquatic vegetation under control, without letting public concerns and costs get out of control, ask for Rodeo. It's the solution to your toughest vegetation problems in and around water.

RODEO®
EMERGED AQUATIC WEED AND BRUSH HERBICIDE
BY Monsanto

ALWAYS READ AND FOLLOW LABEL DIRECTIONS FOR RODEO HERBICIDE. Rodeo® is a registered trademark of Monsanto Company. © Monsanto Company 1992 ROP-2-370BR 1/92

NEW REWARD® HERBICIDE LIGHTNING FAST

When weeds take you by storm, strike fast with REWARD® herbicide. In a flash, new REWARD fries tough aquatic weeds — both emersed and submersed. It also blazes through broadleaves and grasses in non-crop areas, including industrial right-of-ways, golf courses and landscaping. And like lightning, REWARD stays around just long enough to take care of the job.

New REWARD herbicide for lightning-fast weed control. For both aquatic *and* non-crop use. Who says lightning never strikes twice?

For more information on REWARD herbicide, call ICI Product Information at 1-800-759-2500.

Professional Products
Delivering the Promise

Always read and follow label directions.
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