

Aquatics

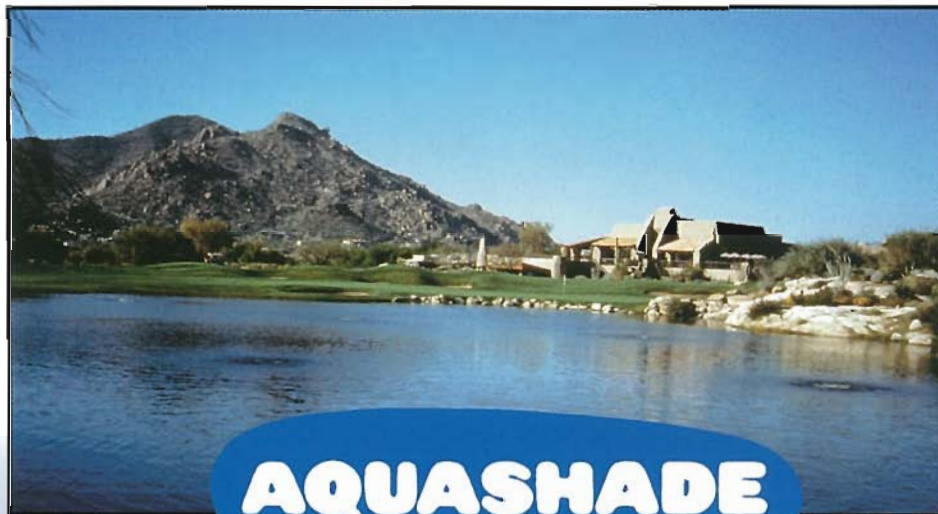
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Editorial

A questionnaire was distributed at the 1998 FAPMS Conference during the annual business meeting. The results of this questionnaire will be printed in an upcoming newsletter, but in this editorial I will focus on the responses as they relate to the *Aquatics* magazine. First of all, thanks to the 242 members who completed the survey, the information you provided is important to the workings of our diverse society. I enjoy editing *Aquatics* and I especially appreciate your comments. As is stated in every *Aquatics* issue "this publication is intended to keep all interested parties informed on matters as they relate to aquatic plant management particularly in Florida."

Here are the results from the question regarding *Aquatics*:

The "Aquatics" magazine has an attractive layout, appropriate topics, and maintains my interest.

Response	Percent	# of respondents
Agree	85.1%	206
No strong opinion	9.5%	23
Disagree	5.0%	12
No response	0.4%	1

Here are some of the written comments.

- More articles are needed as the magazine is getting thinner and thinner
- There should be more articles on FAPMS activities, policies, and programs.
- There should be more articles on applicators (biographies), and on application techniques using less scientific papers.
- *Aquatics* needs more articles on harvesting and best ways of treating common plants.

Continued on page 15



Yes, white pickered weed (*Pontederia cordata*) does exist.

Photo by Dave Sutton

Aquatics

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***Salvinia molesta*
(D.S. Mitchell)
Invades the
United States!**



Salvinia molesta (top) in Oxbow cutoff at Salter Creek, Toledo Bend Reservoir, Louisiana, November 1998. Photo by Harold Temple, Sabine River Authority

Figure 1 (above) *Salvinia molesta* showing various growth stages. Photo by Colette Jacono, USGS

by Colette Jacono,
U.S. Geological Survey

One of the world's worst weeds, *Salvinia molesta*, has made its way to the United States. This prolific floating plant is now established in waters of eastern Texas and western Louisiana. Aquatic plant managers must be able to identify this plant so that control efforts can begin without delay. The following article, taken in part from the US Geological Survey, Nonindigenous Aquatic Species web page (<http://nas.er.usgs.gov/ferns>), provides information on the current distribution of *Salvinia molesta* and notes on identifying features. If you have seen this plant in cultivation or in

the wild, please contact the Nonindigenous Aquatic Species Toll Free Hotline: 1-877-STOP-ANS.

Facts on *Salvinia molesta*

Common Names: giant salvinia, Kariba weed, aquarium watermoss, African pyle

Taxonomy: Family-Salviniaceae; Division-Polypodiophyta (Pteridophyta), true ferns

Identification: Aquatic fern with floating oblong leaves, 1/2 to 1 1/2 inches in length. During early stages plants are smaller and leaves (fronds) lie flat on the water surface. As plants mature and aggregate into

Too many weeds spoil the fishing.

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Have You Seen This Plant?

Giant salvinia, *Salvinia molesta*, is an aquatic fern prohibited in the United States by Federal law.

Status: currently invading sites in Texas and Louisiana, giant salvinia has the potential to infest aquatic habitats, wetlands and rice fields across the south. Native to south America, its introduction by humans has caused severe economic and ecological problems in many countries including New Zealand, Australia and South Africa.

The Problem: Giant salvinia grows rapidly to cover the surface of

lakes and streams, spreading aggressively by vegetative fragments. It forms floating mats that shade and crowd out important native plants. Thick mats reduce oxygen content and degrade water quality for fish and other aquatic organisms. Mats impede boating, fishing, and swimming and clog water intakes for irrigation and electrical generation.

Characteristics: Oblong floating leaves, 1/2 to 1 1/2 inches long. Young plants have smaller leaves that lie flat on the water surface. As plants mature and aggregate into mats, leaves are folded and compressed into upright chains.

Leaf surfaces have rows of cylindrical hairs topped with four branches that are joined at the tips to form a "cage" (view with hand lens). These hairs give a velvety appearance and repel water. Distinguish from common salvinia, *Salvinia minima*, which has leaf hairs with branches always free at the tips.

Underwater root-like structures conceal stalks with egg-shaped spore cases attached. Spore cases are not found on young plants.

Prevention: Plants can be carried overland on anything entering infested waters. Boaters and anglers can help prevent spread by removing all aquatic plants from propellers, intakes, trailers and gear before leaving a launch area. Always blow out jet ski intakes and wash boats and equipment land-side before traveling to a new waterway.

Help Protect Our Aquatic Resources Watch Out For and Report Giant Salvinia

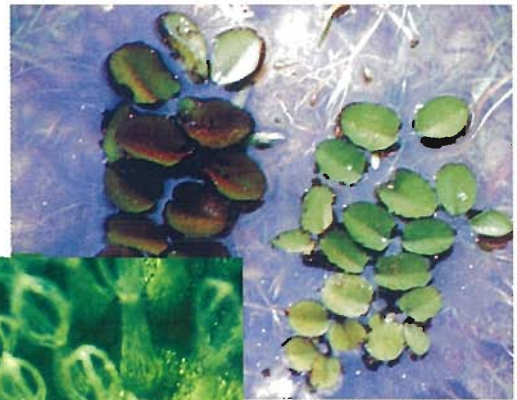
Giant salvinia may be introduced with aquarium or water garden plants. If you have seen this plant in cultivation or in the wild, please contact the Nonindigenous Aquatic Species Toll Free Hotline:

1-877-STOP-ANS

In Texas, call— **Texas Parks and Wildlife Department at 409-384-9965.**

In Florida, call — **Florida Department of Environmental Protection at 850-488-5631.**

More information on the WWW at <http://nas.er.usgs.gov/ferns>



By: C. Jacono, U.S. Geological Survey
 Photos: R. Helton, Texas Parks and Wildlife Department
 Design and Production: Texas Sea Grant College Program

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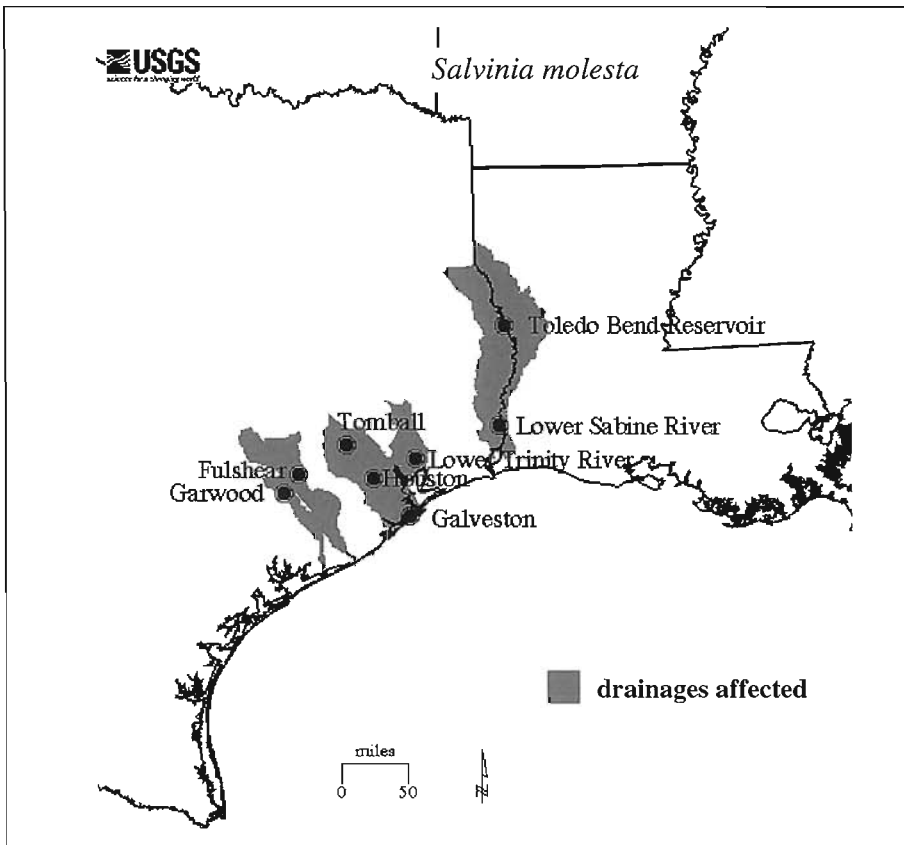


Figure 3. Current locations of *Salvinia molesta* in Texas and Louisiana.

predicted to extend into and colonize open water more aggressively (Oliver 1993).

Nonindigenous Occurrences in the United States: Currently established in eastern Texas and western Louisiana, affecting multiple watersheds, or drainages. Giant salvinia was first observed in Texas during 1997 at a schoolyard demonstration pond in Houston. Plants were identified in May 1998 and by July it was reported as established in the wild at a pond near Tomball. November rains spilled plants from the Tomball pond downhill into a creek, a typical way for plants to enter local drainages.

The infestation posing the most serious threat to interstate spread occurs on the Texas/Louisiana border, at Toledo Bend Reservoir, a 186,000 acre impoundment of the Sabine River, and an extremely popular bass fishing lake. Floating plants, first detected in late September, are now common throughout the main channel, from Logansport, south to the dam, populating both the Louisiana and Texas side of the reservoir. New reports come from below the dam, at oxbows and canals of the Lower Sabine River. Its latest discovery in a wetland of the

mats, leaves are folded and compressed into upright chains (Figure 1). Leaf surfaces have rows of papilla (cylindrical stalks) branching into four hairs that rejoin at the tips to form an egg beater or cage-like structure (Mitchell and Thomas 1972)(Figure 2). This feature distinguishes *S. molesta*, from common salvinia, *S. minima*. Found throughout Florida, *S. minima* has branched hairs that are spreading and free at the tip. Look for these features with a 10X lens.

Giant salvinia has underwater root-like structures that conceal chains of spore cases. However, spores are not known to be involved in reproduction (Mitchell and Thomas 1972). Instead plants effectively reproduce by fragmentation and budding.

Native Range: Southeastern Brazil; between latitudes of 24 and 32 degrees S; more abundant in coastal areas; extending inland to elevations of 900 m (Forno and Harley 1979; Forno 1983).

Habitat: Still waters of man-made and natural lakes and ponds, oxbow lakes, ditches, stream margins, wetlands and rice fields. In the United States, expected to occupy habitats favorable to *S. minima*, yet

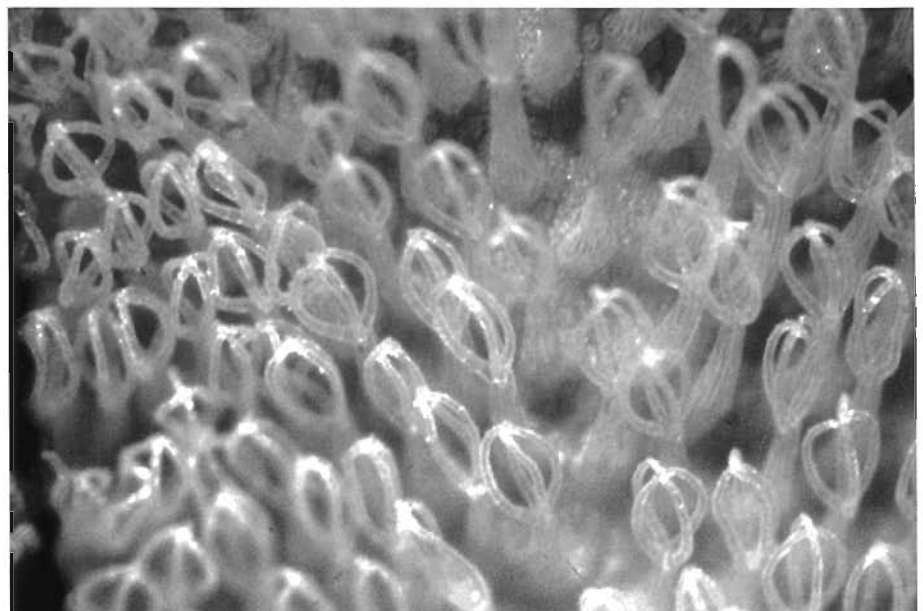


Figure 2. Egg beater, cage-like structures on *Salvinia molesta* which distinguish it from *Salvinia minima*.

Photo by Colette Jacono, USGS

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lower Trinity River spells bad news for the freshwater portions of this sensitive estuary (Figure 3).

Giant salvinia was first reported as established outside of cultivation in the United States in 1995 at a pond in southeastern South Carolina (Johnson 1995). The 1.5 acre infestation was eradicated within a year, before plants had spread locally.

Means of Introduction and Spread:

Water garden nurseries have recently made giant salvinia available in Texas, North Carolina and Arizona. It has been successfully intercepted at aquatic plant nurseries in Florida (Nelson 1984). Infestations at Texas ponds have been linked to local water garden nurseries. How plants were introduced to components of the Sabine and Trinity Rivers is still unknown. Giant salvinia multiplies by breaking to produce numerous new plants that develop from lateral buds. Its upright, well buoyed leaves promote dispersal across water bodies by wind and water currents. At Toledo Bend Reservoir, plants are constantly blown by the wind to infest new coves and shallows. In the main channel they catch and collect on beds of hydrilla.

Plants can be expected to adhere to and be carried overland on anything entering infested waters, including boats, trailers, vehicular wheels, intakes and gear. Giant salvinia has been found along boat ramps and carried out to roads around Toledo Bend Reservoir. Plants were likely vectored by trailer to a boat launch in eastern Louisiana, where they were collected, but, not found to be established.

Impact of Introduction: Rapid and invasive growth typically results in dense surface mats that cover open water, degrade aquatic habitat, obstruct the use of waterways and in effect threaten local economies and human health. In favorable environments plants may be expected to double within about a week (Mitchell and Tur 1975). Excessive growth and dense mats compete with and shade out desirable native

plants. Mats prevent atmospheric oxygen from entering the water while decaying salvinia consumes dissolved oxygen needed by fish and other aquatic life (Thomas and Room 1986). Open water is greatly diminished, limiting fishing, boating and other recreational uses. Mats clog water intakes for irrigation and electrical generation and provide excellent habitat for disease carrying *Mansonia* mosquitoes.

Status: *Salvinia molesta* is designated a Federal noxious weed. In Florida it is a Class I Prohibited Aquatic Plant and possession is prohibited without a permit.

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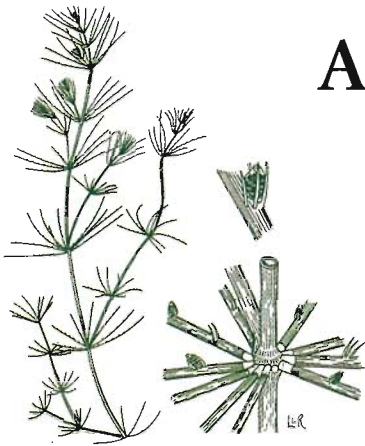
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A Look in the Library



by Karen Brown,
University of Florida, Center
for Aquatic and Invasive
Plants

Being the database coordinator for the Aquatic and Wetland Plant Information Retrieval System (APIRS) may sound like rather *dry* work but actually it can be pretty interesting. While not all 47,000 documents in the library are fascinating, there's a lot of unusual or just plain interesting stuff in our collection. Let's take a look....

It's very easy to become focused on aquatic plant issues here in Florida or just in the United States, but aquatic plants, and weeds, occur all around the world. Our old nemesis water hyacinth (*Eichhornia crassipes*) continues to be a major nuisance in several countries and currently is wreaking havoc on Lake Victoria in eastern Africa. Lake Victoria is 26,560 square miles, or 40 times Lake Okeechobee's 670 square miles. It is the world's second largest fresh water body, second only to Lake Superior, and is bordered by three countries: Tanzania, Kenya and Uganda. Commercial and sustenance fishing is very important in Lake Victoria but the fishery is being threatened by large water hyacinth infestations around the perimeter of the lake (Fig. 1). Control efforts are being hampered by both public and governmental fears about control methods and the difficulties of coordinating manage-

ment efforts among three separate countries.

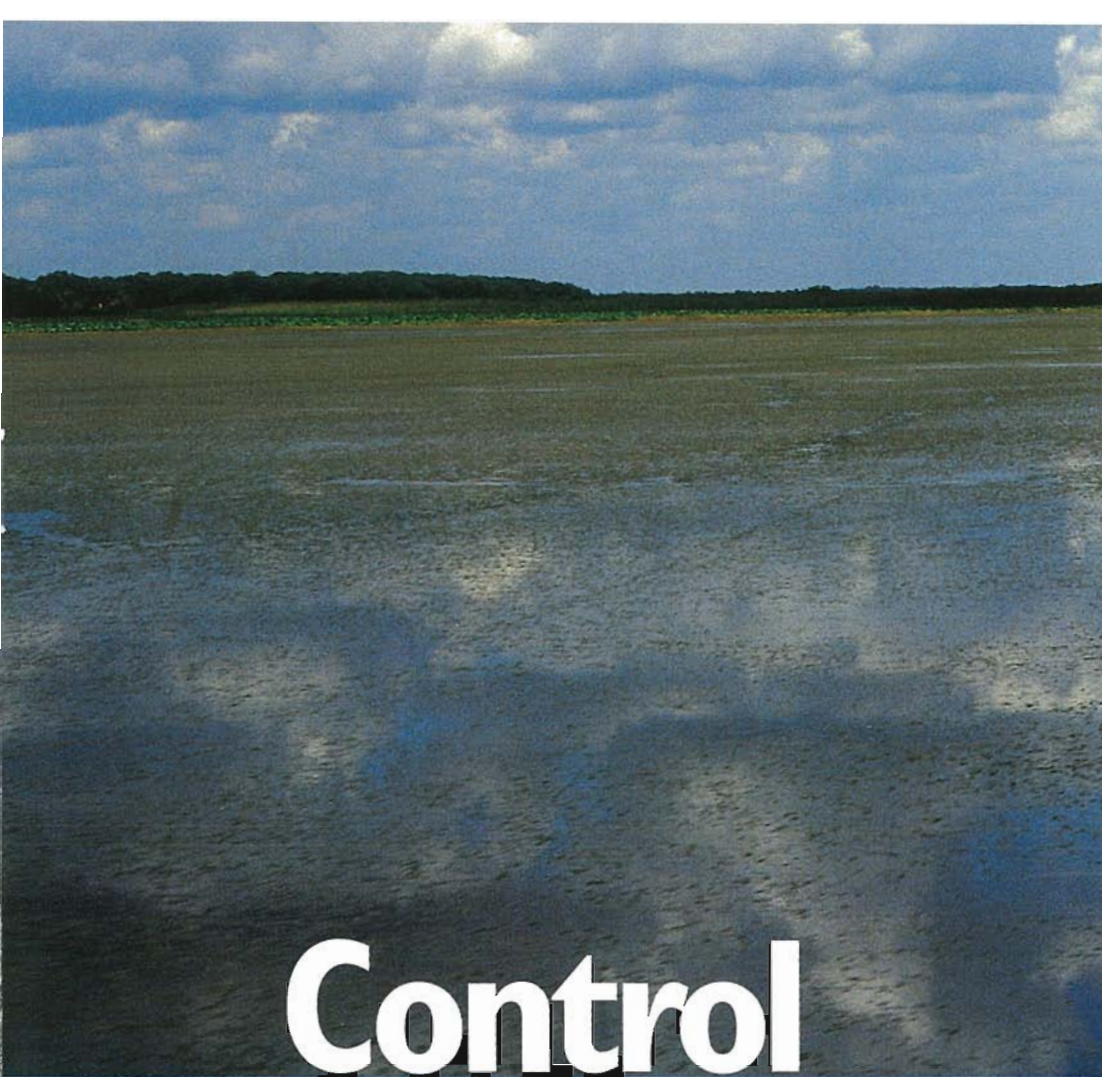
The latest international aquatic weed news is that the year Year 2000 Olympic rowing, kayaking and canoeing course in Penrith, Australia is heavily infested with *Vallisneria americana*, with *Hydrilla*, *Potamogeton* and other submersed weeds lurking nearby. Scientists are frantically working to solve the problem in the 2.5 km artificial course before the start of the next Olympic Games. If they fail, could aquatic weeds make international news? Headline: *Aquatic Weeds Thwart Olympic Games!*

Lake Titicaca, a 3,220 square mile lake in the Bolivian Altiplano, is the highest navigable lake in the world, sitting at an altitude of 12,500 feet.

Top of page. Chara spp. Muskgrass, illustration provided by: IFAS, Center for Aquatic Plants, University of Florida, Gainesville, 1990



Figure 1. Water hyacinth infestation on Lake Victoria in eastern Africa. Photo by Dr. Randall Stocker.



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Figure 2. Boats constructed from *Schoenoplectus tatora*, an aquatic reed, at Lake Titicaca. Photo by Dr. Mark Brenner.

Compare this to lakes in Florida that average about 75' above sea level. Aquatic plants behave rather well there however and water milfoil (*Myriophyllum elatinoides*), as well as *Elodea* and *Potamogeton* species, is harvested as food for livestock and domestic animals. Nitrogen-fixing

Azolla is grown in ditches between agricultural fields and used as fertilizer, and *Schoenoplectus tatora* is grown and harvested to construct beautiful reed fishing boats (Fig. 2).

The *Journal of Psychoactive Drugs*, one not on our highly used journal list, reports in *The Sacred Journey in*

Dynastic Egypt: Shamanistic Trance in the Context of the Narcotic Water Lily and the Mandrake that the blue water-lily, *Nymphaea caerulea*, was used extensively in dynastic Egypt to induce trances for healing and for sacred journeys of the spirit. An unguent jar from the tomb of Tutankhamen (King Tut) bears the face of the god of healing who wears a necklace holding a water lily flower and two water lily buds. According to the author, when the tomb of King Tut was looted, an estimated 400 liters of fluid was taken from sealed vessels, while gold artifacts nearby were left untouched. It was believed by the looters that the vessels contained the elixir of life, the narcotic properties of water lilies, opium poppies and mandrakes. This elixir could induce a profound hypnotic state terminating in an extended period of sleep (which I hope I'm not inducing in you now). This spiritual experience represented a symbolic death, journey and resurrection necessary to shamanic tradition. The blue



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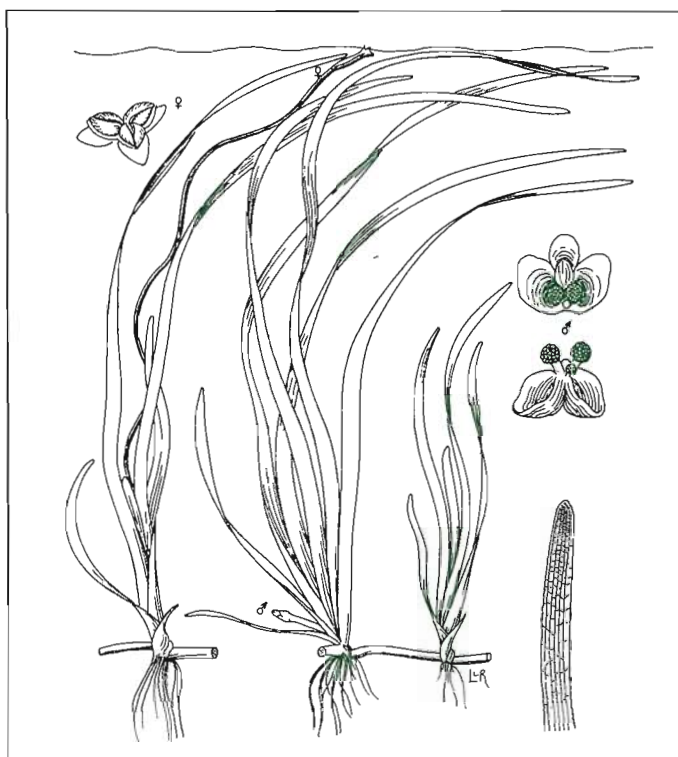
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water lily figures prominently in almost all of the ancient Egyptian conceptions of the origins of the universe. The cult of Osiris believed in the creation of life from chaos in which the dark pool of nothingness gave rise to a blue water lily from which the first being, the sun god Ra, arose. In the life cycle of the blue water lily, the flower closes after blooming for three days and the stalk that supports it contracts to draw the flower beneath the water. To the ancient Egyptians, this symbolised the journey of Osiris into the underworld. Blue water lilies appear in Egyptian art and decoration spanning several dynasties and more than a thousand years.

And in Germany, we have researchers shooting *Chara* into space. You need a lot more education in physics and plant physiology than I possess to truly understand these articles but as near as I can make out, they have been studying the aquatic alga *Chara* during rocket flights to measure the effects of gravity on rhizoid growth, specifi-

cally the rates of cytoplasmic streaming. The authors explain that the sensing of gravity is essential for the survival of plant seedlings which must anchor themselves in the sediment and grow toward the light for photosynthesis, and that 'gravistimulation' of only 0.5 seconds causes a 'graviresponse'. Put simply, a change in gravity produces a change in growth. Cells perceive a change in gravity because it "disturbs the cytoskeletal tension". The researchers videotaped through a microscope the cells in the



Vallisneria americana, Tapegrass, illustration provided by: IFAS, Center for Aquatic Plants, University of Florida, Gainesville, 1990

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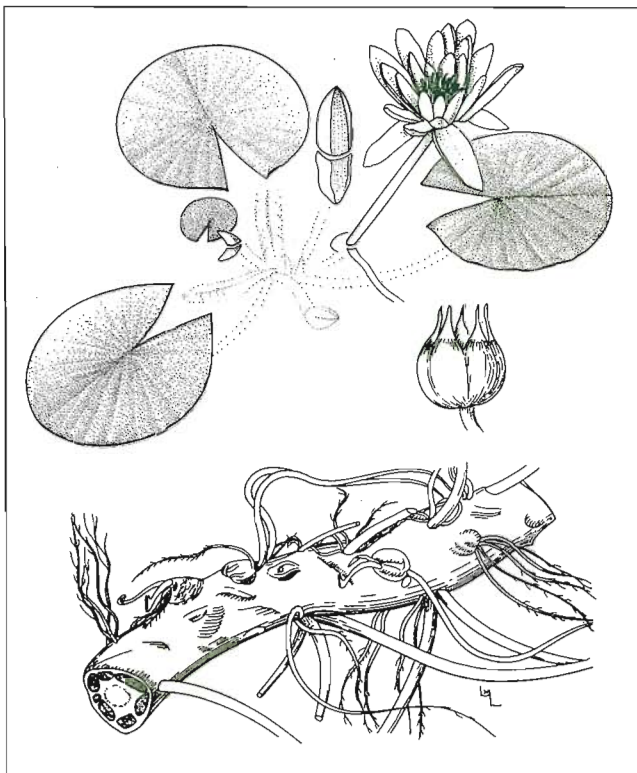
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Nymphaea spp. Water lily, illustration provided by: IFAS, Center for Aquatic Plants, University of Florida, Gainesville, 1990

rhizoids of *Chara* as they were shot up in a rocket to achieve microgravity conditions. This they call *in vivo* videomicroscopy. As Dave Barry would say, I swear I'm not making this up. The research is described in the *Bulletin of the American Society for Gravitational and Space Biology* and other scientific journals.

And in some rather explosive news, American researchers reported that trinitrotoluene (TNT) contaminated soil and water can be

transformed into nonhazardous material by *Myriophyllum* species. TNT contaminated soil and water occurs where munitions are manu-

factured and stored. In a study using parrot feather (*Myriophyllum aquaticum*), TNT was absorbed by the plant and yet was undetectable in plant tissues within one week. Sterilised plants were used to prove that microorganisms were not factors in the decontamination process. Researchers compared the process to the human liver detoxifying substances in our bodies. The plants were burned as part of the research and no explosions were reported.

Well, that should be enough browsing in the library for one day. We'll do it again soon and stay closer to home next time. Just remember (I can't believe I'm going to say this), if anyone ever says aquatic plants are a dry subject, tell 'em they're all wet!

References available from Karen Brown, Center for Aquatic and Invasive Plants, 7922 N.W. 71st Street, Gainesville, FL 32653, 352/392-1799, kpb@gnv.ifas.ufl.edu

FLORIDA AQUATIC PLANT MANAGEMENT SOCIETY

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You might be a "nozzlehead" if:

Your dream work-airboat would have a tinted glass bubble, air conditioner, heater, stereo, recliner, reverse, nitro-turbo charger, runs silent and contains no company ID

You have ivory handles and target sights on your spray gun, but really wish it were a double barrel.

You use the same term, "power load," in reference to airboats, 30-06 re-loads, and coots in early lift off.

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Hopefully to be considered as light humor by most, this column is written for all the hardworking and caring professionals who dedicate their work afield to excellence in aquatic plant management. David Tarver*



Editorial

Continued from page 3

- *Aquatics* needs to publish papers presented at the annual meetings.
- Other topics suggested were articles on native animals, aquatic arsenal, and Chinese tallow control.
- Ideas for regular features included, an applicator question and answer column, comic strip, funny "this happened to me" type stories, and how best to manage (*fill in the plant of choice*).

These comments are very helpful and I will try to incorporate the suggestions into future issues of *Aquatics*. Don't wait until the next annual meeting to voice any other concerns or comments you may have throughout the year, contact me or any board member at the numbers listed on page three of this issue. Remember too, that the board meetings are open to all society members; check *Aquavine* in this issue or your newsletter for the place and date.

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An Interview With the FAPMS 1998 Applicator of the Year, Carl Smith

Aquatic Weed Supervisor,
Highlands County Invasive Plant Department

By Judy Ludlow

Editors note: 1999 has been designated the Year of the Applicator by FAPMS president Jim Brewer. This article, and hopefully more like it, is designed to help us get to know some of the hard working members of our diverse society.

How did you become interested in aquatic plant management?

I've always enjoyed outdoor activities and nature; aquatic plant management seemed liked an interesting career to get into.

How did you get started in the field of aquatic plant management?

I started with Highlands County in 1977 as a motor grader operator. I then transferred to the Highlands County Invasive Plant Department as a Spray Operator in 1980. In 1985



I was promoted to Spray Tech overseeing aquatic plant management on Lake Istokpoga. In 1988 I became the Aquatic Weed Supervisor.

What's the best part of your job?

Being out on the lakes, and public outreach / education. Most importantly it is the people I work with. My supervisor (Ms. Vicki Pontius) and my crews (Bruce Burley, Chris Mayhew, and Willy Ward) help make my job easier and enjoyable.

What's the worst part of your job?

Just as public outreach / education can be the best part of my job, it can also be very frustrating.

What recommendations do you have for someone entering the field of aquatic plant management?

You need to see beyond the "fun" parts of the job like air-boating, and being outdoors, and take what you are doing very seriously. We all have a responsibility to the environment and you need to know what you are doing, and learn all you can about your job.

What do you feel are the important aspects of your job as an aquatic plant manager?

Safety first, doing a professional job, working with the public, and sustaining maintenance control of invasive plants.

AQUATIC PLANT SCHOLARSHIP GRANT

The South Carolina Aquatic Plant Management Society, Inc. is seeking applications for its annual scholarship grant. The Society intends to award a \$2,000 grant to the successful applicant in the Fall of 1999.

Eligible applicants must be enrolled as full time undergraduate or graduate students in an accredited college or university in the United States. Course work or research in an area related to the biology, ecology or management of aquatic plants in the Southeast is also required.

Applications must be received no later than May 1, 1999. Other factors being equal, preference will be given to applicants enrolled in Southeastern and South Carolina academic institutions. The successful applicant may be requested to present an oral report at the annual meeting of the Society.

**For additional information on application procedures, contact
Danny Johnson**

**SC Department of Natural Resources
2221 Devine Street, Suite 222
Columbia, SC 29205**

803-734-9099, or e-mail, johnsond@water.dnr.state.sc.us

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CALL FOR PAPERS

**FAPMS 1999
ANNUAL MEETING**
October 5-7, 1999
Daytona Beach, FL

Now is the time to get your slot on the soon to be fabulous program. Remember that this Society was formed for the applicator and the annual meeting is a chance to share what you have learned with other members. Each year, the Society awards all applicators (non supervisory field staff) who present a paper with a plaque. The applicator who presents the best paper will also receive \$100.00! We are looking for papers on herbicide application techniques, mixtures, innovative control methods, etc....

DEADLINE FOR SUBMISSION IS JULY 31, 1999

SUBMIT YOUR 75 WORD OR LESS ABSTRACT and BIOGRAPHY TO:

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AQUAVINE



More New Arrivals

Tracy Wood of Applied Aquatic Management, Inc. and wife Brenda welcomed their new daughter this past summer. Past President, Francois Laroche and wife Dominique welcomed their new son last September. All are doing fine; Congratulations!

Need Back Issues of Aquatics?

Need to fill in some gaps in your *Aquatics* magazine collection? Back issues are available by contacting Ken Langeland at 352-392-9614, Center for Aquatic and Invasive Plants 7922 NW 71st Street, Gainesville, FL 32653.

Check out DEP's Bureau of Invasive Plant Management Website!

If you've been there once, check it out again. This site will now feature monthly aquatic plant management highlights from around Florida. January's feature describes the dramatic drawdown on Rodman Reservoir. The 1997-98 Annual Report (with lots of pictures!) is also available in its entirety. An appendix is attached which lists all of Florida's public waters, 1998 survey results for hydrilla and floating plants, and management information. The internet address is www.dep.state.fl.us/stland/bapm

Unwanted Salvinia Found in Naples Area Canal!

After seeing a flier on the *Salvinia molesta* invasion in Texas, Ken Baker of Lake Doctors, Inc. called DEP with a possible siting in Florida. The site is a South Florida Water Management District (SFWMD) canal in the Naples area (photo below). As of February 15, 1999, the culprit *Salvinia* has tentatively been identified as *S. molesta*. The only other possible species it could be is one of three types of *Salvinia auriculata*, all of which are prohibited in Florida. This unwanted salvinia is now targeted for eradication by SFWMD Big Cypress Basin crews. Thanks go to Ken Baker for bringing this to DEP's attention!!



Photo by Jackie Smith, DEP

MEETINGS

Aquatic Weed Control, Aquatic Plant Culture and Revegetation Short Course. May 17-20, 1999. Ft.

Lauderdale, FL. Contact Vernon Vandiver or David Sutton at 954-475-8900

The Florida Lake Management Society Annual Conference will be held May 26-28 at the Safety Harbor Resort & Spa in Safety Harbor (Clearwater area). For meeting information contact Nancy Page at (727)464-4425 or via email at npage@co.pinellas.fl.us.

Aquatic Plant Management Society 39th Annual Meeting

July 11-14, 1999
Radisson Hotel
Asheville, North Carolina
Deadline for submitting a talk is April 26, 1999
Contact Lewis Decell at 601-638-7150

FAPMS Board Meeting

April 14th, 1999 Daytona Beach Holiday Inn, contact John Rodgers 813-744-6163.

FAPMS 1999 Annual Meeting

October 5-7, 1999 Daytona Beach Holiday Inn, contact John Rodgers 813-744-6163.

Florida EPPC 1999 Fourteenth Annual Conference

May 24 - 27, 1999

Holiday Inn University Center, Gainesville

The 14th annual Florida Exotic Pest Plant Council conference will be held May 24-27, 1999 in Gainesville, FL at the Holiday Inn University Center. An exciting and informative technical agenda coupled with field trips and social events will highlight the natural and historical features of the Gainesville area.

Individual reservations are being accepted by the Holiday Inn, so reserve your space now! Rates are \$66.00 single and \$74.00 double, plus tax. To get the conference rate, please contact the hotel directly. Telephone is 800-249-2018, or 352-376-1661. E-mail reservations may be made at the following address: HIGNVUS@mindspring.com.

Funny how some traditions just feel natural.



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	24 hours	92%	92%
	48 hours	93%	93%

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Source: Van Thai, K., et al, *Weed Science*. 1987. Volume 35: 247-252.

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