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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 questionnaire regarding Aquatics:

The “Aquatics” magazine needs more articles on attractive layout, appropriate and maintains my interest.

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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 pickerel weed (Pontederia cordata) does exist.

Photo by Dave Sutton

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EDITORIAL: Address all correspondence regarding editorial matter to Judy Ludlow, Aquatics Magazine.
Salvinia molesta (D.S. Mitchell) Invades the United States!

by Colette Iacono, 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
Figure 3. Current locations of *Salvinia molesta* in Texas and Louisiana.

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 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

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

*Photo by Colette Jacono, USGS*
Rodeo® herbicide controls emerged aquatic weeds and brush, including annual and perennial grasses and broadleaf weeds—roots and all. Rodeo has no water restrictions when used as the label directs. As a member of the Roundup®-branded family of products, Rodeo is trusted by professionals and homeowners alike. For more information about Rodeo, call Monsanto at 1-800-332-3111.
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 hydilla. 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.

References:
A Look in the Library

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

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 management 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 submerged 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.
Every bass angler worth his salt recognizes and appreciates the value of structure. Aquatic vegetation plays an important role in providing structure for fish and wildlife. But exotic invasive plants like hydrilla and Eurasian watermilfoil crowd out the more beneficial native plants, thus disrupting a diverse habitat. This mixture or balance of plants and structure can improve both the number and quality of fish.

Let the exotic plants go uncontrolled and the balance is lost. Everyone from anglers to sport fish and native plants suffers from their choke hold.

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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
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, specifically 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’.

Vallisneria americana, Tapegrass, 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 manufactured 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@gmv.ifas.ufl.edu

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

Copyright © and Disclaimer! 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

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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 like 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
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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....

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Contact Lewis Decell at 601-638-7150

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

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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.

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Hydrilla exposed to REWARD for only 12-24 hours resulted in up to 92% injury. Active ingredient in REWARD is diquat dibromide. Initial concentration of full rate of REWARD (2 quarts per surface acre) is 0.37 ppm. (Response of young monoecious and dioecious hydrilla plants emerging from tubers to different REWARD concentrations and exposure times. Data recorded at 6 weeks after application.)


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