

# Florida Aquaculture

## Brynes find new *Victoria spp.* water lily in Brazil

Don and Shirley Bryne, longtime aquatic plant producers, founders of Suwannee Laboratories, Inc. and internationally recognized water lily hybridizers, led several expeditions during January and February to the confluence of



Don Bryne stands waist deep in Amazon backwaters displaying the underside of a dwarf *Victoria* water lily.

the Rio Branco and Rio Negro in the Amazon in search of a reputed dwarf version of the *Victoria* water lily (*Victoria amazonica*).

The Brynes coordinated three parties over a five

week period and enlisted extensive local assistance

to locate plants in remote, stagnant oxbows only accessible by foot and ex-

plored by small canoe carried into the site. Under their direction the plants were photographed and tissue and seed samples collected.

Unexpectedly, they may have discovered a new

species. The new lily exhibits smaller leaves and a different flower color, leaf shape, and spine patterns. Dr. Pam Soltis, Florida Museum of Natural History, cultured the new species and *V. amazonica* from seed collected during the trip and compared their DNA profiles. Her initial analysis indicates that a fourth species may be added to the *Victoria* genus almost 200 years after the *Victoria* water lily was first described in 1810.

The Brynes are working with retired botanist Patrick Nutt of Longwood Gardens near Philadelphia to publish a complete description and introduce the new plant to science.

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## Apple snail taxonomy changes

A team of Florida International University and University of Hawaii scientists published DNA analysis that indicates there are five non-native apple snails in the United States: *Pomacea canaliculata* (California, Arizona, Florida, and Hawaii), *P. insularum* (Florida,

Texas and Georgia), *P. haustrum* (Florida), *P. diffusa*, and *Marisa cornuarietis*.

Important to Florida aquaculturists is that an apple snail commonly called the mystery snail, golden mystery snail or spike-topped apple snail taxon-

omy has changed from *P. bridgesii* to *P. diffusa* and three snails have been differentiated from what was previously misidentified as the channeled apple snail, *P. canaliculata*. Their results imply that *P. insularum* may negatively effect wetland (continued on page two)



Scientists confirm this animal is *Pomacea insularum* not *P. canaliculata*.

## Apple snail taxonomy cont'd from page two

systems and agriculture as much as the well-known channeled apple snail, *P. canaliculata*, that is credited with being a voracious consumer of wetland plants, taro, and rice in Southeast Asia and Hawaii.

Clarifying the taxonomy of these snails is critical to understanding

what species are present, their distribution, how they may effect wetland systems and agricultural crops, applying information in the scientific literature, and how they may be managed or controlled.

The full paper has been published on the web as "The identity, distribution,

and impacts of non-native apple snails in the continental United States" by T.A. Rawlings, K.A. Hayes, R.H. Cowie and T.M. Collins at <http://www.biomedcentral.com/bmcevolbiol/>. Contact the corresponding author, Dr. Tim Collins at [collinst@fiu.edu](mailto:collinst@fiu.edu), for additional information.

## Aquaculture leaseholders must maintain lease markings

Sovereign submerged land leaseholders must properly install and maintain lease markers. All aquaculture lease markers authorized (approved) in the lease instrument must be maintained at all times, and must be sufficient to warn passing vessels of potential hazards to navigation. Lease marking requirements are described in the lease agreement.

All lease corners must be marked in a consistent manner. Failure on the

part of the leaseholder to do so, constitutes a violation of the terms and conditions of the lease agreement, and may constitute grounds for the State of Florida to terminate the lease agreement.

When an aquaculture lease is not properly marked, leaseholder rights are compromised, law enforcement capabilities are limited, and the leaseholder's ability to monitor the lease for unlawful activities is diminished. It is also unlikely that law enforcement officials will be able to make arrests and gain convictions for theft when leases are not properly and accurately marked. Additionally, relaying will not be permitted to a lease that is not properly marked.

All aquaculture leases must be marked with either signs, buoys, or posts (stakes), depending upon the location of the lease parcel (markers

must be consistent). The marking requirements for individual leases that are located within aquaculture use zones may be different, depending upon where they are located.

### Signs

A sign (minimum 2 ft. x 2 ft.) is required to mark specific points in aquaculture use zones, generally the corners and points at intervals on long boundary lines. These larger

signs may also mark individual lease parcels. Signs shall be attached to poles (four inch diameter) and extend a minimum of three feet above mean high water. Signs must be maintained at their original

positions. Signs must display the geographic position of the sign relative to its position on the lease and the lease number in two-inch black block characters (ex., NE 75AQ000). Signs must have a two-inch border and be marked with a "diamond" symbol using international orange reflective paint or tape over a white background. The sign may include informative language, for example, "RESTRICTED USE AREA", "HARVESTING PROHIBITED EXCEPT BY LESSEE". Informative language will be in black block letters (one-inch minimum) and must be approved by the Division of Aquaculture.



### Posts and Stakes

Stakes may be used to mark corners and perimeters that are not otherwise marked by signs. Corner markers shall contain a field at least 2-1/2 inches wide and 20 inches long. The background shall be white with international orange bands of reflective paint or tape above and below the field. The geographic position of the post relative to its position on the lease and the lease number must be displayed in two-inch black block characters (ex., NE 75AQ000). The identifying field on the post shall extend a minimum of 24 inches above mean high water. Stakes may be made of carsonite, fiberglass, PVC, or other approved material.

### Buoys

Buoys may be used to mark corners and perimeters that are not otherwise marked by signs. Buoys shall be white with an international orange band of reflective paint or tape above the field. The geographic position of the buoy relative to its position on the lease and the lease number must be displayed in one-inch black block characters (ex., NE 75AQ000). The buoy must be floated upright at a minimum height of 14 inches above the water.

For additional information, contact Mark Berrigan, 850-488-4033 or [ber-rigm@doacs.state.fl.us](mailto:ber-rigm@doacs.state.fl.us).

## Nitrate changes in spring-fed rivers by Dr. Tom Frazer, University of Florida

Nitrate occurs naturally in aquatic systems, including springs that feed rivers along Florida's Gulf coast. Nitrate is assimilated by aquatic plants and algae

and is one of several nutrients that contribute to their growth. An increase in the supply of nitrate has the potential to stimulate growth with negative ecological consequences. Excessive nutrient enrichment may favor the development of nuisance plant and algal species and may ultimately lead to the decline of native vegetation. Increased periphyton growth (a complex mat of algae, bacteria, and organic matter) on rooted aquatic plants, as a consequence of increased nutrient input, can exacerbate the situation.

The potential eutrophication of Florida's spring-fed rivers, as a result of increased nitrate delivery, is a primary concern for water resource managers. Recent research carried out by University of Florida faculty, staff and students in the Department of Fisheries and Aquatic Sciences suggests that several spring-fed river systems along Florida's Gulf coast have indeed been negatively affected by increased nutrient inputs. Highlighted here are some key findings from the Weeki Wachee, Chassahowitzka and Homosassa rivers.

Nitrate concentrations have increased significantly in the springs that feed all three of these river systems. Since 1998, nitrate concentrations in the headwaters of the Weeki Wachee River, have increased by approximately 50%. In the Chassahowitzka and Homosassa rivers, ni-

trate concentrations near the spring complexes, which serve as the origin of flow, have increased by 20% and 6%, respectively. The increases in nitrate concentration coupled with concomitant increases in flow rates in each of the three rivers has resulted in substantially greater nitrate loads. In fact, calculated nitrate loading rates near the headwaters of the Weeki Wachee, Chassahowitzka and Homosassa rivers have increased by 76%, 43% and 56%, respectively, since 1998.

Soluble reactive phosphorus concentrations have also increased significantly in each of the three river systems. This is of concern given that previous work in these rivers has indicated a strong potential for phosphorus limitation of algal growth. In the upper regions of the Weeki Wachee River, mean soluble reactive phosphorus concentrations increased by as much as 21% since sampling was initiated in 1998. Increases of 19% and 15% were documented in the upper regions of the Chassahowitzka and Homosassa rivers, respectively. Loading rates, calculated from data collected near the headwaters of the Weeki Wachee, Chassahowitzka and Homosassa rivers, increased by 33%, 44% and 46%, respectively.

Coincident with the increased nitrogen and phosphorus concentrations and higher nutrient loading rates, were marked declines in submersed aquatic vegetation (SAV). The Weeki Wachee River exhibited an approximate 75% reduction in mean SAV biomass. A similar reduction was observed in the Homosassa River, i.e., 67%. An approximate 31% reduction

in mean SAV biomass was observed in the Chassahowitzka River. Noteworthy was the observed decline in the frequency of occurrence of native species such as tape grass in the Homosassa River and strap-leaf sagittaria in the Chassahowitzka River. The abundance of periphyton associated with rooted macrophytes (large plants) increased significantly in both the Homosassa and Chassahowitzka. In fact, mean periphyton abundance on the remnant macrophyte population in the Homosassa was nearly twice as high (85% increase) during 2003-2005 than it was in 1998-2000. In the Chassahowitzka River, the increase in mean periphyton abundance on macrophytes was 30% during the same time interval.

The changes noted above are, in combination, legitimate reasons for concern. Increased nutrient delivery, loss of native macrophytes and increased periphyton loads are symptomatic of eutrophication-related phenomena. The potential broader consequences of nutrient over-enrichment on the ecological health and integrity of the Weeki Wachee, Chassahowitzka and Homosassa rivers, however, have yet to be fully investigated. Continued monitoring of these systems is ongoing and essential to evaluate the effectiveness of ongoing nutrient reduction strategies and future remediation efforts aimed at reversing the negative effects of nutrient over-enrichment.

Adapted from an article that appeared in *WaterWorks*, Nov. 2006, available at <http://fishweb.ifas.ufl.edu>.



**Weeki Wachee River**

Photo courtesy Southwest Florida Water Management District and Richard Gant



**Homosassa River**

Photo courtesy Southwest Florida Water Management District and Eugene Kelly

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### Florida LAKEWATCH planning new facility

Founded in 1986, Florida LAKEWATCH coordinates 1,500+ volunteers sampling 621 lakes, 118 river/creek stations, and 126 coastal sites. Water quality, fisheries, aquatic bird, bacteria, mercury, and aquatic plant collected by the program is utilized by scientists and researchers at the University of Florida, Department of Fisheries and Aquatic Sciences, water management districts, and other state agencies to assess water quality changes, land use effects, and the effectiveness of land use planning, water treatment, and storm water storage strategies. Florida LAKEWATCH has initiated a \$1,000,000 fund raising effort to create dedicated laboratory and office space for LAKEWATCH staff, university scientists and visiting scientists. Private contributions are tax deductible and will be matched dollar-for-dollar by the State of Florida.

For additional information contact Dr. Daniel Canfield, Jr., at 352-392-9617 ext 246, [decan@ufl.edu](mailto:decan@ufl.edu), or visit <http://lakewatch.ifas.ufl.edu/>.

Contributions should be made out to the University of Florida Foundation, Inc.—SHARE with "Florida LAKEWATCH Building" in the memo line and mailed to IFAS/SHARE Development Office, 1001 McCarty Hall D, PO Box 110170, Gainesville, FL 32611-0170.

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