



Aquatics

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On the Trail for Snails

Pink Egg Clutches, Sign of the Exotic Island Apple Snail

Cattail Identification in Florida
Key Characteristics to Look For

Aquatic Plant Management in the
Kissimmee Chain of Lakes
Addressing Hydrilla Control and Snail Kite Survival

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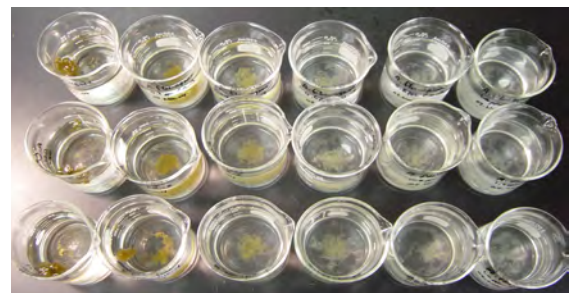
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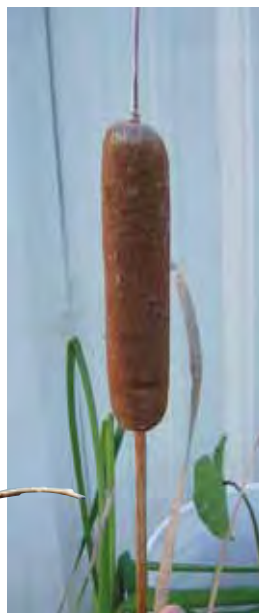
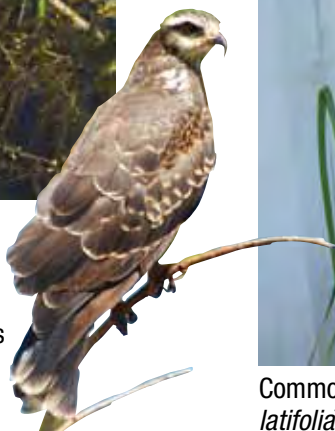
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Herbicide Labels Have Changed – Do You Know The Changes?

By Jerry C. Renney, Jr., Applied Aquatic Management, Inc.

Have you read your herbicide labels lately? Go ahead and be honest. After all you may be pondering this in the privacy of your favorite reading room. The label tells us how much product we can use and how much stuff we have to wear while using it. You are probably thinking that the labels are the same as the last time you read them because they still look the same, and if something important had changed SOMEONE would have told you. Take a moment to look in the mirror as you rise in the earlier mentioned reading room to wash your hands. The buck stops with you when it comes to making pesticide applications.

The truth is **labels do change** and sometimes in such subtle ways that only diligent scrutiny by a dedicated applicator will reveal the modifications. The burden is on you, the applicator, to read the label. Many of you may have attended countless instructional dialogues where you bore witness to the incantation of the industry mantras “the label is the law” or “read the label”. When our instructors tell us this, they are serious. And once again, **labels do change**.

One of the most common changes has been in the area of personal protective equipment (PPE). To use a perfect example let us examine 2,4-D amine: tried and true, older than most of us, the godfather of our industry, the surest tool in the box. Never changing, right? Not so fast, for the

past year or so this author has monitored many of the trade-name 2,4-D products, specifically in the area of PPE changes. Not all of them have changed at this time but enough to remind the applicator to read the label. The PPE requirement changes lump all mixers, loaders and applicators together for most of the PPE equipment. In addition, where the labels formerly read “protective eye wear” for applicators, they now specifically call for either goggles or face shield. Using goggles or a face shield while mixing concentrate may be warranted and understandable, however, wearing them all the time, even while applying, could prove to be a deal breaker on a hot August day. With this PPE requirement applicators may look toward product alternatives.

Before writing this I called Dr. Kenneth Langeland at the University of Florida to vent about the requirement to wear goggles or a face shield all the time with some of the 2,4-D products and inquired to whether or not this trend would continue with the other products. Dr. Langeland was also watching this trend and was unsure whether the trend would continue.

The point once again is: **SOMEONE** may not tell you there has been a label change because that **SOMEONE** is not the applicator. You are. Read your labels again and be sure to review your personal protection equipment requirements.

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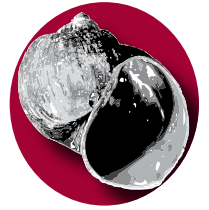
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On the Trail for Snails



By Charles Bedard

*St John's River Water
Management District*

Summary of
Charles Bedard's
presentation at
the 32nd Annual
FAPMS Conference.

Spread into Orange Creek Basin

The encroachment of the Island Apple Snail (*Pomacea insularum*) was documented by L.A. Gettys and W.T. Haller in the fall issue of *Aquatics Magazine* (Fall 2007/Vol. 29, No. 3). Florida Fish and Wildlife Conservation Commission's non-native species database shows the exotic snail's distribution to occur in isolated sites Statewide (Figure 1). However, this exotic pest was not known to occur in the Orange Creek Basin of the St John's River system. In October of 2008 private applicators found Island Apple Snail eggs near the Windsor boat ramp in Newnan's Lake, Alachua County, FL. This report marked the only known infestation in the Orange Creek Basin and required immediate action to head off a potential new threat to aquatic life.

Newnan's lake supports recreational activities such as fishing and boating, which holds potential for further spreading egg clutches of this highly invasive species if left uncontrolled.

Exotic Snail Lays 1,000 Eggs a Week

The life history of the Island Apple Snail was described in detail by Gettys and Haller in the fall 2007 issue of *Aquatics magazine*.

In brief, this species of Apple Snail is native to South America, lives up to three years; produces egg clutches of up to 1,000 eggs per week, competes with native apple snails for food and habitat, and may disrupt food webs due to its consumption of large quantities of aquatic plants. Egg clutches are commonly observed as red to bright pink egg masses attached to objects above the waterline. Usually when adult snails are observed and counted the total number of snails in the area is much higher than the few observed. A compounded problem is that adult snails have been found for sale in pet and aquarium shops, adding to the potential for future infestations.

Staff of the SJRWMD's Invasive Plant and Environmental Sciences Program worked across agency boundaries to create a working group incorporating the Florida Fish and Wildlife Conservation Commission (FFWCC), Florida Department of Environmental Protection (FDEP), University of Florida's IFAS department (IFAS), private contractors, and local media into the Island Apple Snail Control Program on Newnan's Lake (Figure 2).



Figure 2. Newnan's Lake, site of the first known infestation of the Island Apple Snail in the Orange Creek Basin.

Island Applesnail (*Pomacea insularum*)
FWC Non-Native Species Database
31 March 2008

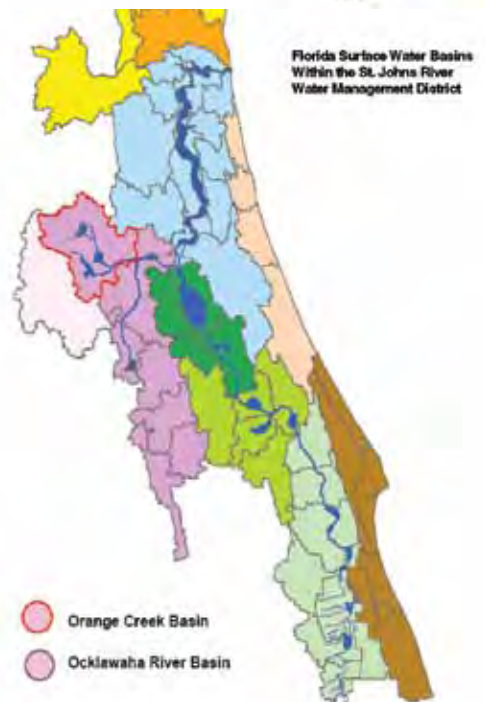


Figure 1. Distribution of verified Island Apple snail locations throughout Florida (top). Location of the Orange Creek Basin within the St. John's River waterway (bottom).

Control Efforts Begin

The primary goal and objective of the snail control program was to develop a strategy to eradicate, or at least minimize, the snail population in Newnan's Lake and the Orange Creek Basin. The strategy needed to address negative impacts on non-target organisms such as fish and invertebrates, minimize the impacts on recreational activities (ramp closures, fishing restrictions, etc.), and include an educational component to promote public awareness.

The SJRWMD working group created an integrated pest management control plan incorporating the following segments:

1. Method to track and record egg locations, movements, and snail populations utilizing GPS positioning technology and ESRI's ArcView GIS software program.
2. Technique to apply cooking oil to egg clutches to cause larvae suffocation.
3. Technique to locate and hand-remove obscure egg clutches.
4. An application of granular copper sulfate to treat adult snails.
5. Technique to bait-and-trap adult snails.

1) Tracking Snail Populations

Public awareness is an important part of the overall plan to control Island Apple Snail infestations. Figure 3 and 4 shows brilliant pink coloration of the egg clutches and the different types of structures that the exotic snails can utilize for egg incubation.

Another component of the plan involves the tracking, documentation, and mapping of Island snail populations. Using global information system software the uncontrolled expansion of the Island Apple Snail population in Newnan's lake was documented during the initial survey period (Figure 5).



Figure 3. Dock piling at the Windsor boat ramp on Newnan's lake with a clutch of Island Apple Snail eggs attached.



Figure 4. One form of aquatic vegetation used by adult snails for attaching egg clutches.



Figure 5. GIS maps showing the expansion of Island Apple Snail egg clutches over a three week period. Left to Right: Oct 9th = 79 egg clutches, Oct 19th = 103 egg clutches, Oct 27th = 143 egg clutches.



Figure 6. Egg clutch being coated with cooking oil using both a painted brush and spray bottle methods. Cooking oil stains surrounding clutch of snail eggs as a marker that the egg clutch has been treated

Three weeks after the copper treatment was conducted egg clutches were found outside the initial treatment area and additional treatments were conducted.

2) Cooking Oil Applications

Coating the eggs with cooking oil was conducted on egg clutches to prevent larvae from hatching and keep the population in check (Figure 6). One quart of cooking oil treated as many as 143 clutches

3) Hand Harvesting.

Hand harvesting egg clutches was conducted to prevent larvae from hatching, to keep the population in check, and aid in monitoring snail activity (Figure 7). When eggs clutches were located they were dislodged into harvesting buckets along with any adult snail found in the area.

Figure 7



4) Chemical Control of Adult Snails

The public provided positive feedback with their understanding of the importance for this control project. Copper sulfate (crystals) maintained an EPA label for use on gastropods and was therefore selected to treat the Island Apple Snail adults. An airboat rigged with a vortex blower was utilized to apply the copper crystals. Depth and area measurements were conducted to calculate the total acre feet of the treatment site. The appropriate amount of copper product was calculated. To ensure thorough coverage, the treatment area was broken up into seven small management units. In total, the boat ramp was closed for two days during the application.

The majority of the chemical control was conducted using the vortex grain-blower equipment whereas handheld spreaders were utilized in and around cypress. This control method provided control of adult and larval stages with a

potential for non-target damage. The initial treatment was conducted at a 3 ppm application rate with the second and third follow-up treatments applied at 4 ppm application rate (Figure 8).

Post Copper Treatment Observations

- Total of three copper treatments were conducted
- Follow-up visits revealed eggs outside the treatment area(s)
- As air and water temperatures began to rise, the snails appeared to become more active
- Egg clutches fewer in number but spread out over greater surface area
- Keeping copper concentrations elevated in the treatment area proved to be a problem when only treating a small fringe adjacent to a 4,800-acre water body
- Dense, emerged vegetation and cypress swamp made tracking the snails/eggs difficult
- Minimal non-target damage achieved

5) Baiting and Trapping

Baiting and trapping was conducted on a small scale to evaluate the effectiveness of this control method on adult snails.



Figure 8. Applicator Brandon Morris uses a vortex blower handgun to apply the copper crystals while the boat operator Tom Boyette maneuvers around dense stands of Pickerelweed, Cypress trees, and other emergent vegetation.

Summary

Despite the control efforts of cooking oil applications, egg harvesting, chemical copper treatments, and trapping, the Island Apple Snail population still exists in Newman's Lake. Chemical and hand control efforts have greatly reduced the snail population and confined it to the eastern shoreline of

Newman's Lake. Baiting and trapping yielded poor results due to the small scale of the experimental method and lack of egg and larvae control. As of July 2008, only 12-15 clutches were found since last copper treatment. Monitoring and egg harvesting efforts will continue to be conducted in the future along with habitat enhancement efforts.

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Aquatic Plant Management in the



Kissimmee Chain of Lakes

By Ed Harris
Florida Fish and Wildlife
Conservation Commission

In 2009, 450 waterbodies with a combined surface area of more than 1.25 million acres were eligible for public funds to manage aquatic plants through the Florida Fish and Wildlife Conservation Commission's (FWC) Invasive Plant Management Section. In an average year, approximately 60,000 acres of plants, mostly invasive species, are managed in as many as 375 of these waters. Nowhere is aquatic plant management more important or more complex than in the Kissimmee Chain of Lakes (KCOL). The greatest portion of the KCOL is comprised of four large waterbodies – Lakes Tohopekaliga (Toho), Cypress, Hatchineha, and Kissimmee – that total nearly 60,000 acres. These waters, which make up about

five percent of the total surface area of public waters in Florida, received nearly \$5 million, almost 30 percent of FWC's total aquatic plant management budget. The majority of these funds were spent to suppress hydrilla; nearly 50 percent of the total hydrilla standing crop reported in Florida public waters during 2009 was in these four lakes.

The KCOL provides a variety of habitat, recreational, commercial, and public safety attributes. These lakes are world-renowned for their largemouth bass fishing and numerous commercial ventures exist solely because of this fishery. The KCOL is part of the Central and Southern Florida Flood Control Project authorized by Congress in 1948, providing flood protection for several communities that are expanding along the shores of the KCOL. The KCOL also serves as a northern refuge for the endangered Everglades Snail Kite; the majority of surviving

kites are now found on Lake Toho. All of these concerns must be taken into consideration when planning aquatic plant management operations.

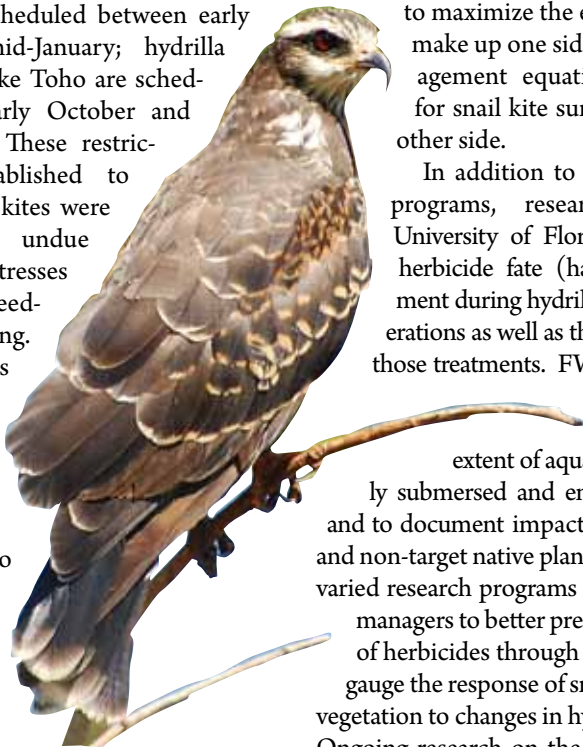
The management of floating invasive plants, water hyacinths and water lettuce, is the top priority for FWC's Invasive Plant Management Program. Next in line is the management of new hydrilla infestations; the control of plants that are blocking public access and navigation; the creation of open water areas inside dense hydrilla mats; and large-scale hydrilla suppression to conserve the uses and functions of Florida public waters. In recent years, hydrilla management objectives in the KCOL have focused on the maintenance of navigation and flood control priorities and the enhancement of native emergent and submersed plants (mainly knotgrass and eelgrass).

A small interagency group was formed

in the 1980s to aid communications between the Florida Game and Freshwater Commission, the Florida Department of Natural Resources, the South Florida Water Management District, and the U.S. Army Corps of Engineers. More than 25 years later, this group still exists – although the membership roster has swelled to nearly 100 individuals from city, county, state, and federal agencies in addition to hunting and angling organizations, state universities, and a variety of citizen groups. Even though FWC is the lead entity for aquatic plant management, the creation of a KCOL aquatic plant management plan involves input from all of these stakeholder groups.

In recent years, the survival of the snail kite has become the overriding factor in aquatic plant management planning and operations on the KCOL. Led by the U.S. Fish and Wildlife Service (USFWS) and FWC, with substantial input from the University of Florida, the KCOL interagency group has drafted a set of guidelines that outline timing of plant management activities and buffer zones around nesting and foraging areas on lakes where kites are present. Floating plant management activities cannot occur within 500' of any active kite nest and activities are limited within 1500' of any active nest. Habitat zones of special concern are marked and any plant management activities in these areas must be vetted through the USFWS.

Hydrilla management programs also require extensive planning throughout the year. For all the lakes except Toho, hydrilla treatments are scheduled between early October and mid-January; hydrilla treatments on Lake Toho are scheduled between early October and mid-December. These restrictions were established to ensure that snail kites were not exposed to undue environmental stresses at the time of breeding and nesting. This also means that treatment planning must begin in July or August in order for each stakeholder group to review and comment by the October start of work. In recent years, most hydrilla manage-



ment in the KCOL has been accomplished with the use of the herbicides Aquathol K or Aquathol Super K (dipotassium salts of endothall). Environmental conditions to maximize the effects of endothall make up one side of the plant management equation and concerns for snail kite survival make up the other side.

In addition to snail kite research programs, researchers from the University of Florida (UF) monitor herbicide fate (half-life) and movement during hydrilla management operations as well as the plant response to those treatments. FWC is also contracting with Remetrix LLC to map the extent of aquatic plants, especially submersed and emergent vegetation, and to document impacts to target hydrilla and non-target native plants. Data from these varied research programs have enabled plant managers to better predict any movement of herbicides through the waterbody and gauge the response of snail kites and native vegetation to changes in hydrilla populations. Ongoing research on the role of non-native

apple snails in the snail kite's life history is also expected to provide valuable information and assist resource managers in crafting habitat improvement programs.

Research is still needed to gain a more complete understanding of the factors that guide snail kite behavior and survival. Preliminary results indicate that plant managers can tailor their programs to extend greater protections to an endangered species than was previously believed. The success of the hydrilla management program in the KCOL clearly demonstrates that invasive plants can be controlled while conserving or enhancing the identified functions of these multiple use waters. Native submersed plants are expanding and reclaiming historic territories, flood protection is not being compromised, and fishing tournaments are reporting record catches throughout the entire KCOL. Snail kite populations are not experiencing sharp declines as previously seen. Although this species may not fully rebound until previous habitats are reclaimed in south Florida, we expect to be able to enhance their habitat on the KCOL through a variety of habitat improvement projects, including the thoughtful management of hydrilla.

Identification of Cattails (*Typha* spp.) in Florida

By Kurt M. Vollmer

Cattail Distribution

Cattail (*Typha*) is probably the most common species of emergent aquatic plant found throughout the world, and is present throughout the U.S. Cattails occur in most wetland areas, providing food and vital nesting habitats for birds and other animals. The common name of this species is derived from the cylindrical flower spikes that resemble a cat's tail. These spikes can grow to be more than a foot long and are packed with tiny flowers. Seed production is important for the colonization of new areas (250,000 seeds/seed head), but the majority of vegetative expansion occurs through the growth of underground rhizomes. Cattails grow large with certain mature species reaching heights of 15 ft. or more.

Cattails often form monotypic stands, causing them to be thought of as a nuisance along lake margins and shorelines; however, they do serve important functions in maintaining water quality. Cattails absorb nutrients such as phosphorous and nitrogen, and they filter runoff before water flows into the water body. Therefore, cattails may be desirable in one place, but unwanted in another. In low nutrient ecosystems, such as the everglades, cattails quickly out-compete other native species such as sawgrass (*Cladium jamaicense*). However, cattails are currently being used as a mitigation species in stormwater treatment areas. These artificial wetlands act as a nutrient filter using cattails and other aquatic plants to regulate nutrients from agricultural and urban runoff before it reaches the everglades. In addition, cattails help to stabilize shorelines and prevent erosion.

Throughout the world cattails have been used for several economic purposes. Leaves, roots, and rhizomes may be eaten raw or cooked and contain an abundance of nutrients and protein. Dried leaves can be woven into furniture and mats and their pulp can be used to make paper and string. Native Americans have

been known to make bread from cattail pollen and leaves have also been used for thatch making and basketry.

Four Common Species in U.S.

There are three major species of cattail found in the United States and at least one common hybrid. Each of these three species is native to the lower 48 states except the narrow-leaved cattail (*Typha angustifolia*). This species is believed to be native to Canada, and is not commonly found in southeastern states such as Georgia, Alabama, Mississippi, and Florida. Common characteristics of cattails include: erect linear leaves, an extensive rhizome system, and dense cylindrical flower spikes. Rhizomes are approximately 2-3 ft. long and ¼-1 ¼ inches in diameter, typically growing 3-4 inches below the soil surface. Anywhere from 12-16 leaves may arise per vegetative shoot, and both male and female flowers grow on the same spike with a small gap occurring between them in certain species.

Broad-leaved cattails (*Typha latifolia*), also known as common cattails, grow in all 50 states; occurring in arctic, temperate, and subtropical regions (Figure 1). It is usually found inland and in relatively undisturbed habitats. Mature plants are 3-10 ft. tall. Leaves of this species are pale grayish-green in color, flat, with a D-shaped cross section. Leaves are approximately 1/3-3/4 in. wide, and typically do not extend taller than the flower spike. Male flowers are 3/16-1/2 in. long, and female flowers are 2-3 mm long when in flower and 10-15mm long when in fruit. While flowering, the female fruiting spike is initially pale green, but later dries to a brownish color.

Narrow-leaved cattails (*Typha angustifolia*) are also common throughout much of the northern United States, but most populations in the south are small and sporadic. They can generally be found in relatively unstable environments with calcareous, basic, or salty soils. Mature plants are shorter than broad-leaved cattails and only reach heights of 3-6 ft. Leaves of narrow leaved cattails are fully



Fig. 1: Seed head of broad-leaved or common cattail (*Typha latifolia*). This flower spike is thick, dark-brown in color, and is typically no taller than leaves in the stand.

Photo by Kurt Vollmer. University of Florida 2008

green, typically ½-1 in. wide, and slightly convex. Flowers have a distinct 1 to 3 in. gap between male and female portions, whereas the flower spike of broad-leaved cattails are continuous. The flower spikes of narrow-leaved cattails are also much thinner than broad-leaved cattails. Male and Female flowers are approximately the same length, male flowers are a light brown in color, and female flowers go from green to brown as fruiting occurs. Narrow-leaved cattails can be generally distinguished from broad-leaved cattails by their narrow, deep-green leaves, an obvious separation between male and



Fig. 2: Seed head of southern cattail (*T. domingensis*).

This flower spike is thin, light brown in color, and leaves are typically shorter than the flower spike. Note the space between the male (top) and the female (bottom)

female flowers, and leaves that typically grow taller than the flower spike.

Southern cattails (*Typha domingensis*), also known as tall cattails, are found in both temperate and tropical areas worldwide. In the United States, southern cattails can be found in coastal areas of the southwest, southern California, and east to southeastern Virginia. This species tends to be found in brackish waters and in nutrient-enriched areas. Mature leaves can reach over 10 ft. in height. Leaves are yellowish-green in color, 1/4-1/2 in wide, with 6-9 leaves per shoot. Male and female flowers are similar to the narrow-leaved cattails and also have 1/2-3 in. gap separating them, as well as a thinner flower spike than broad-leaved cattails (Figure 2). Thus, southern can be difficult to distinguish from narrow-leaved cattails. Southern cattails are generally taller and have flattened and more numerous leaves.

Broad and narrow-leaved cattails can also form a hybrid species *Typha x glauca*. Many of the characteristics of this hybrid are intermediate between the two parent plants. Mature plants of the hybrid species can reach 3-10 ft. in height, with leaves 1/4-3/4 in. wide. Leaves of narrow-leaved cattails tend to be wider at 1/2-1

in. Male and female flowers also have a 1-4 in. gap separating them. Even though broad and narrow-leaved cattails commonly form hybrids, it is not uncommon for all three species to hybridize with one another, which makes positive identification difficult.

Three Easy Identification Tips

In summary, if the leaves you are examining have a thick, solid, dark-brown flower spike, and the leaves are no taller than the flower spike, then it is likely to be broad-leaved cattail (*T. latifolia*). If there is a thin, light-brown flower spike with a gap between male and female flowers, and the plant is only 6 ft. tall or less with the leaves no taller than the flower spike, then it is most likely narrow-leaf cattail (*T. angustifolia*). If the plants have characteristics similar to narrow-leaved cattail, but are distinctly very large (>6 ft. tall) the species is likely southern cattail (*Typha domingensis*). Fortunately, the ecological role of *Typha* species is similar, so it is not critical to be able to correctly identify the plant to the species level.

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Table 1. Characteristics of Cattail species.

Species	Leaf width (in.)	Typical Height (ft.)	Gap in Flower Spike	Leaf Color
<i>T. latifolia</i> (Broad-leaved)	1/3-3/4	3-10	absent	Grayish green
<i>T. angustifolia</i> (narrow leaf)	1/2-1	3-6	present	Fully green
<i>T. domingensis</i> (Southern)	1/4-1/2	>10	present	Yellow-green
<i>T. x glauca</i> (hybrid)	1/4-3/4	3-10	varies	varies

CEU Credit

By Andy L. Price, Sr., VMC, LLC

On Wednesday, October 14, 2009, those attending the FAPMS 2009 meeting were given the opportunity to observe, touch, and discuss equipment utilized in aquatic operation and plant management programs. Those in attendance were given C.E.U credits. It is estimated that 75-80 of the members attending the meeting visited the equipment demonstration set up in the convention parking lot.

Three exhibitors had equipment on display at the site and technical representatives present to explain operational procedures and answer questions. The following exhibitors had equipment on static display:

Equipment Demonstration *at the* 2009 Annual Conference



1. **Texas Aquatic Harvesting, Inc.** displayed a floating barge equipped with two cutter heads that can be used for shredding up floating mats and tussocks of aquatic material. They also displayed a large harvester utilized in removing floating emerged and submerged aquatics from various water bodies.

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2. Clear Lake, Inc.

located in Idaho, displayed their boat that is utilized for applying herbicides with deep application hoses for the control of submerged aquatic vegetation. The size of the boat, outboard motors and long trailing application hoses makes the equipment ideal for large, deep lakes .



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Ft. Pierce, FL
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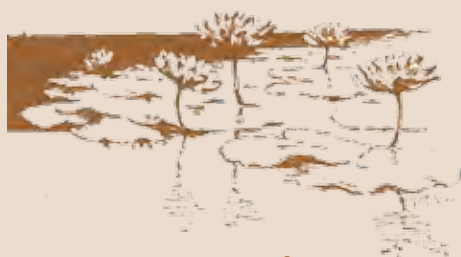
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3. Alumitech, Inc. - VMC, LLC: Alumitech and VMC have joined together to design airboat and spray equipment specifically for aquatic application. The new airboat and invert/conventional spray rig was displayed, which can be used for all types of aquatic plant management. A smaller airboat with a battery powered spray rig was also on display.



Aquavine

Osceola County 2010 Field Day for the Hydrilla and Hygrophila Demonstration Project: May 27, 2010

Experts will be on-site to discuss the problems associated with aquatic weeds (particularly hydrilla and hygrophila) and the \$2.9 million grant awarded to Osceola County from EPA to study the problem. Topics will include new and existing herbicides and biological control. We will have boat tours of treatment areas, exhibits

highlighting demonstration results for this project, aquatic plant displays, and more! Lunch will be provided. Register online at <http://fieldday2010.eventbrite.com/> For additional information or to register over the phone, contact Stacia Hetrick at (321) 697-3036, or shet@osceola.org

The Endangered Species Act (ESA)

The ultimate goal of the Endangered Species Act (ESA) is the recovery (and long-term sustainability) of endangered and threatened species and the ecosystems on which they depend. The act is administered by the Interior Department's U.S. Fish and Wildlife Service (FWS) and the Commerce Department's National Marine Fisheries Service (NMFS). There are a total of 108 species listed as threatened or endangered in the state of Florida. In many instances threats to a protected species may be caused by invasive species. They may either directly harm the species

by causing mortality or may threaten a species by modifying or destroying the habitat or food source on which that species depends. A variety of methods and procedures are used to recover listed species, such as reduction of threats (including invasive species), protective measures to prevent extinction or further decline, consultation to avoid adverse impacts of Federal activities, habitat acquisition and restoration, and other on-the ground activities for managing and monitoring endangered and threatened species. Please visit the FWS web site www.fws.gov to learn more about this topic.

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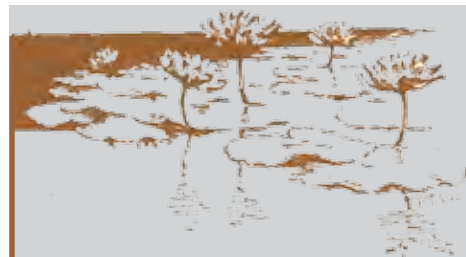


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Calendar

May 3-6, 2010

Aquatic Weed Control Short Course

Coral Springs, FL www.conference.ifas.ufl.edu/aw

May 27, 2010

2010 Hydrilla Field Day for the Hydrilla and Hygrophila Demonstration Project

Kissimmee, FL <http://field-day2010.eventbrite.com/>

July 11-14, 2010

50th Annual Meeting of the Aquatic Plant Management Society (APMS)

Hyatt Regency, Bonita Springs, FL www.apms.org

Sept 12-16, 2010

140th Meeting of the American Fisheries Society (AFS)

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