Aquatic Weed Training Course Attended by Almost 500 Participants

by Tyler J. Koschnick, University of Florida/IFAS
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Every year hundreds of people from the United States and abroad who are involved with aquatic and invasive plant management converge on south Florida to attend the Aquatic Weed Control Short Course. The four-day Short Course is one of the largest Extension programs sponsored by the University of Florida’s Institute of Food and Agricultural Sciences (IFAS).

This year over 460 aquatic and invasive plant managers participated to improve their job performance and personal safety and to minimize environmental impacts including damage to non-target species. Florida likely has the largest aquatic plant management program in the world, spending more than $70 million annually. The state encourages the integration of biological, chemical, and mechanical methods to remove unwanted aquatic and invasive plants.

Under U.S. federal and state laws, applicators of pesticides classified as restricted use (RU) must be trained and certified in general knowledge of proper pesticide use and safety (referred to as core requirements) and in their respective area of work (aquatic; natural areas; turf and ornamental; etc.)

Though no currently registered aquatic herbicides are classified as restricted use in Florida, most employers and public agencies insist that their applicators be trained and certified to improve personal safety and application expertise.

The Aquatic Weed Control Short Course is designed primarily to provide the necessary training to certify people in natural area and aquatic weed control categories. The course also is designed to offer continuing education units (CEUs) to those already certified and licensed in aquatic plant management categories. Licenses must be renewed every four years with a required amount of CEUs in each category.

This year’s courses included equipment calibration, aquatic and natural areas weed control, core examination standards, reading and interpreting a pesticide label, basic weed science, selective weed management, plant identification, weed ecology, and state and federal rules and regulations.

Continued on page 7
State Gets Earful From Lake Rousseau Anglers

More than 50 fisher men and women recently took the opportunity to tell state water managers their observations of the plants and fish on Lake Rousseau in west north-central Florida. Some anglers were not happy; some said things were okay — everyone, anglers and water managers alike, agreed that the muck buildup in the lake is affecting fish spawning; they wish there were a way to remove the muck and the advancing *Lyngbya* algae to expose the sandy bottom beneath.

The June 3rd meeting was hosted by Mr. Rob Hation of the Lake Rousseau RV and Fishing Resort near Dunnellon. Representing the Florida Department of Environmental Protection was Mr. Terry Sullivan, plant biologist with the Bureau of Invasive Plant Management. Representing the Florida Fish and Wildlife Conservation Commission was Mr. Jerry Krummrich, fisheries biologist. State Senator Nancy Argenziano (District 3) also was in attendance and spoke of her concerns.

Mr. Sullivan presented a slide show on invasive aquatic plant management and fielded questions about herbicide toxicity, possible herbicide effects from upstream treatments, treatment

**Audience members asked a variety of questions:**

- “Aren’t the fish contaminated by the herbicides? - why the 3-day fish-consumption restriction?”
- “What’s causing shoreline plant reduction; isn’t there supposed to be a 12-foot fringe all around?”
- “Part of the lake bottom has no plants; didn’t the herbicides kill off the eelgrass as well as the hydrilla?”
- “Why don’t you control hydrilla by drawing down the lake like they do at Rodman Reservoir?”
- “Why have the floating islands been destroyed?”
- “Where have the birds gone?; What about saltwater encroachment?”
- “Why not put it back the way it was?”

While some complained that shoreline plants have been greatly reduced, others complained that their fish camps were difficult to get to because of too many plants. Another said he lost $100,000 in the six month period that hydrilla got in the way of fishing, but things are good now.
frequency and plant abundance. Sullivan said that hydrilla, which only two years ago filled much of the lake, was now under "maintenance control" thanks to herbicide treatments.

Mr. Krummrich described current electro-fishing data for the lake, saying that Lake Rousseau ranks "average" in its number of bass over 15 inches long, compared to other bass lakes in the state. Krummrich said he does not believe Lake Rousseau has been overfished but that for a number of reasons young fish are not surviving to adulthood.

Senator Argenziano praised plant and fish management efforts in general but specifically objected to a lack of progress in controlling the nuisance algae, lyngbya. Lyngbya is a black-looking blue-green algae that is quickly replacing submerged plant beds in a number of north central Florida rivers and springs. Argenziano believes management agencies are "using band-aids" to control the rapidly expanding algae.

Lake Toho Muck Removal Project Complete

The largest whole lake enhancement project ever attempted in Florida has been completed on Lake Tohopekaliga near Kissimmee. Now we wait for rain to refill the lake to judge its success. "Lake enhancement" here means "enhancement of fish and wildlife habitat," according to the Florida Fish and Wildlife Conservation Commission's Kissimmee office.

Lake Toho, considered a premiere bass fishing lake, had been suffering from static water levels and excessive plant growth which led to thick deposits of bottom muck. The muck buildup had filled areas needed for feeding by wading birds and spawning by fish.

The plan has been to dewater (draw down) part of the lake, expose 40% of the lake bottom for three months, scrape up and remove more than 9 million cubic yards of muck from more than 3,700 bottom acres, and allow the lake to refill with summer rains. The last truckload of muck was removed and re-filling began on June 15, 2004.

Over time, it is expected that the natural plant seed bank will give rise to healthy stands of knotgrasses, bullrushes, eelgrass and other desirable plants. Workers will manage for the desirable plant species and against the problematic plant species.

This lake enhancement work has pushed back the process of eutrophication on Lake Toho. One expected response to the work is the maintenance of a high level of fish productivity for years to come. V.R.

Photos by Chris Michael, FWC.

Lake Toho enhancement is a project of the FWC in cooperation with the South Florida Water Management District, the U.S. Army Corps of Engineers, and the Florida Department of Environmental Regulation, along with researchers of the University of Florida and others. For further information, contact Mike Hulon or Marty Mann of the FWC Aquatic Resources Enhancement Section, 1601 Scotts Road, Kissimmee, FL 34744, 407-846-5300.
few animals are more friendless than the alligator. With claims to neither beauty nor intelligence, he is not hand- some enough to win our admiration, nor dangerous enough to make us respect him. For hours he basks in the sun, floating on the surface of the water, or lying on some muddy bank, apparently as useless as the log of wood he so much resembles. Every man’s hand is raised against him. He is killed by the tourist in pure wantonness, simply because he affords a mark for the ever-ready rifle. Hunters slay alligators by thousands for their hides and teeth. Indeed, it is for these alone that the alligator is prized. I think, however, that, like everything else in nature, the alligator plays a part in the drama of animal life for which he is especially adapted.

It is said that on the lower Mississippi River alligators feed on muskrats, and the recent decrease in the number of alligators has been followed by a corresponding increase in the number of muskrats, which seriously weaken the levees by burrowing in them. If this be true, the alligator is here of direct value to the planter, and should therefore be protected by law.

However, my plea for the alligator is not based on his powers as a destroyer of muskrats, but on his services as a land-maker. It does not seem probable that so stupid and sluggish an animal should be a factor in changing a stagnant pool of water - a breeding ground for miasmatic germs - into a fertile pasture where cattle may graze. Nevertheless, I think it can be proven that he aids in accomplishing this remarkable transformation.

Several years ago I passed the winter studying birds and mammals near Gainesville, Florida. Among my especial desiderata were a singular little round-tailed muskrat, known as Neofiber (which had previously been found only on the Indian River), and a peculiar semi-aquatic hare. A resident of the region suggested that these animals might be found on the floating islands of "Bevan’s Arm." This "Arm," a branch of Alachua Lake, is what is known in Florida as a "bonnet lake." The name will be familiar to any one who has visited Florida, for "bonnet lakes" are abundant throughout the State. Imagine a lake so thickly covered with a growth of pond-lilies that the water shows only in occasional patches. The lilies are both of the yellow and of the white varieties, but the former are by far the larger and more numerous. Some leaves measure eighteen inches in diameter, and the stems of many project nearly two feet above the surface of the lake. The water is sometimes fifteen or twenty feet in depth, and in the clearer spaces much deeper. It is filled with many species of aquatic plants, in which one’s oars become entangled, and these, added to the abundance of lily leaves or "bonnets," make rowing a difficult and tiresome matter.

In one of the open spaces near the centre of the "Arm," which was here about half a mile in width, were the islands. There were several of them, irregularly circular in shape and varying in diameter from about ten to nearly fifty feet. They were densely grown with reeds and grasses of many species, and, in some places, tall flag-like sedges and button baskets grew.

To a naturalist, floating islands possess a strong fascination. They are like earthly satellites floating about in watery orbits. The animals which inhabit them seem to belong to a sphere of their own. The isolation of their island-home affords them protection from their mainland enemies, and this is doubtless why animals are so abundant on the islands in the "Arm." Certain it is, I have never seen a bit of ground of similar extent so densely populated.

Rowing slowly out through the "bonnets," one was greeted by a chorus of frog-like gruntings which seemed to issue from under every lily leaf. It was made by young alligators. The "Arm" was a nursery for them. They were of all sizes, from little fellows six or eight inches in length, born the preceding summer, to fully grown adults measuring ten feet or more. The smaller ones are found in schools, families, perhaps; occasionally, to sun themselves, they crawl upon lily leaves floating on the surface of the water, making as ideal pictures of lazy contentment as one can well imagine. The larger ones will support the weight of an alligator three feet in length.

One of the larger islands was my daily resort for nearly two weeks, and I will confine my account to the history of this particular island, speaking first of the life upon it, then of its probable origin.

I always approached it with caution, in order that I might have a glimpse of its largest inhabitant. This was an alligator about eight feet in length. His habit of crawling from the water on to the island at a certain place had resulted in his wearing away the shore, until he had formed a miniature harbor. He "builted better than he knew," and here on the muddy shore he dozed the hours away, enjoying, although he did not know it, the fruits of his own or his fellows’ labors. On my appearance he would half slide, half roll, off into the water; the waves rippled outward in ever-widening circles; a few bubbles rose to the surface, and I saw no more of the king of the islands that day.

My landing was a few feet beyond. It was made, and my boat "beached" in a unique manner. The island was two to three feet in thickness, and floated in water from fifteen to twenty feet in depth. As I stepped from my canoe on to its edge it sank slowly beneath my weight, and, stepping backwards, I could thus draw the floating canoe after me; but as I advanced toward the centre of the island the shore rose, and the canoe was lifted from the water by this kind of natural drydock.

Progress now was very much like walking on cracked or partially melted ice. Where the grass grew thickly there was a firm footing, but the spaces between the little hillocks were treacherously soft. To fall through an island would no doubt be a novel experience, but one that the experimenter would doubtless never attempt again.

Although none of the residents were visible, it required but a glance to show that this island was thickly populated. Broad avenues entered and left the water. There was a network of roads,
pathways and trails leading to grassy nests well hidden at the base of a hillock, or to underground tunnels with entrances half-closed with mud. Close inspection showed the tracks of many feet. As I walked carefully about this city - for it was nothing less - I felt like a Brodingtonig in Lilliputia. While the place was apparently deserted, I knew that the inhabitants were all at home. With them it was night, and my presence was doubtless causing many a heart near me to beat with unaccustomed rapidity.

On this little fragment of earth there proved to be representatives of almost every class of the animal kingdom. The broad avenues leading to the water were made by the marsh hare. This hare resembles our common "cotton-tail," but its tail is of drab, and not of white, cotton, while its feet are less heavily furred and are partly webbed. Its presence on these islands shows how aquatic are its habits. It swims readily, and is thus especially fitted to live in the low-lands of the South, where floods are more or less frequent. Indeed, the habitat of this hare and its congener, the water hare, is entirely included within that part of the lower Mississippi Valley and adjacent regions which is subject to inundations.

The smaller paths led to nests of dry grasses in the hillocks. These were the homes of marsh-rats, a native species, smaller than our imported house-rats, and with a denser, heavier fur, which sheds water easily, and thus forms an excellent suit for these swamp-loving animals. The underground passages proved to have been made by the rare neofiber, and there were also some of its singular dome-shaped houses, built of woven grasses, with a single chamber, having both exit and entrance.

Here, then, were three species of mammals living in harmony on a bit of ground only a few yards square.

Many species of birds occasionally used the island as a nesting place. There were white herons and blue, bitterns, ducks and others; but I will tell only of those which seemed to make the island their home. Of these probably the most common were the boat-tail grackles, a name they have acquired from their habit when on the wing of holding their long tail-feathers on edge, as it were, the tail thus resembling in form the hull of a boat. The males are beautiful birds, with glossy blue-black plumage, while the females are of an inconspicuous dull brown. They place their large nests of grasses in the tall flags, laying eggs curiously ornamented with hieroglyphic-like markings.

There were also great numbers of red-winged blackbirds, the males having scarlet epaulets, and the females, as usual, being dull, obscure-looking birds, but I do not think they nested on this particular island.

Green herons built their platform-like nests of sticks in the button-bushes near by. Their young were ungainly accumulations of wings, legs, and a long neck, all radiating from one small centre, and a scanty covering of white hair-like feathers did not add to their gracefulness. A strange, startling voice I heard sometimes in the reeds probably belonged to a king rail, who showed himself on only one or two occasions. It was a most singular cry, a loud Bap, Bap, Bap, many times repeated, as though some one was rapidly striking a resounding board.

Florida gallinules were always common, and in May a number of their purple cousins arrived from the South. It was a pleasure to watch these graceful birds stepping daintily over the lily leaves while feeding. Their many strange notes all bore a suggestion of the barnyard about them, a character quite out of keeping with their surroundings. I found only one nest, constructed of reeds and placed like a staging over the water. The plumage of the purple gallinule is of a deep indigo below and of a bright greenish-blue above, and it wears a scarlet helmet. Its under tail-feathers are white, and when the bird is on the wing, holding its tail at right angles to the plane of its body, this white mark becomes a conspicuous object.

One morning I found a "pellet" which had been disgorged on the island by some owl. It contained the skull of a cotton-rat, which had probably fallen victim to a barred owl.

Of reptiles, in addition to the alligators, there were snakes and turtles. One morning I saw a hideous moccasin snake lying coiled in the grasses almost at my feet - a loathsome creature, nearly four feet in length, possessed of a power which rendered his very hideousness strangely attractive. Poisonous snakes have the sort of fascination for us that belongs to scaffolds and guillotines and other means of sudden and violent death. I killed this snake and took him home as a specimen, assuring myself, however, that he was thoroughly dead before placing him in the canoe, where he would not have proved an especially desirable companion had he revived when I was halfway to the shore.

A few days later a small water turtle which had come ashore to lay its eggs was found. It had laid one egg in a small hole at the base of a hillock, and another was laid in the canoe.

Doubtless there are several kinds of insects on the island, but I found only one species. This was an ant. Probably the ants on this little detached world were more numerous than all the other animals combined. They lived in the only dry spot, a little mound near the centre of the island. Their home was inconspicuous, and might have escaped notice entirely had I not sat down on it!

To return now to the history of these islands and the part alligators play in building them. These gigantic lizards love to lie in the soft mud at the bottom of lakes; and they carefully select such places in which to hibernate during the colder months.

Now, if one could see a "bonnet" lake from which the water had disappeared, it would be noticed that its bottom is a network of interlacing lily-pads. The roots are as large as a man's arm, and it will be readily seen how they would prevent a large alligator from snugly nesting in the oozy mud. The alligator, therefore, prepares his bed by biting and pulling out these roots, and they come floating to the surface, showing plainly the marks of his teeth, to form the framework of a future island. Every stage of its growth could be seen in the "Arm." Numbers of these roots float together and form a kind of raft. A scum collects about it, dust settles upon it, and the whole soon looks like a sheet of mud which undulates with the waves. As it becomes firmer, a small plant, always of the same species, makes its appearance, entirely covering the island, and growing so evenly that one might suppose its seed had been carefully sowed by hand. Later stages are now merely questions of time, but it is probably only a few years before the roots torn from the bed of the lake by the alligator are firmly woven into a compact mass by the grasses and reeds which take possession of it, and we have then an island quite similar to the one I have described.

This, it is true, is not a pasture, but it may become one at any time. Some day a strong wind will blow this island ashore- indeed, I saw islands which had been stranded-and then the roots in its bottom will prove living anchors, holding it to its moorings, and by and by the floating island will become firm ground over which
cattle may graze. As island after island is blown against this one, the "Arm" recedes, the shore becomes dryer, and ere long it will be firm enough to support cattle which are attracted by its luxuriant growth of grasses.

And now what becomes of our villagers? Search the shore as you will, comparatively few traces of them are to be found. Robbed of the isolation of an insular life, they soon disappear to seek new homes where they will be more secure from the attacks of their enemies. The alligator gives place to the cow, the grassy nests of the marsh-rats and neofiber are soon overturned by prying pigs.

**Coming Soon!**


by Chet Van Duzer

This book is a unique treasury of information about one of nature's marvels: floating islands. The bibliography contains more than 1500 citations of books and articles in twenty languages on the subject; the entries are annotated and cross-referenced, and there are both thematic and geographic indices. All aspects of floating islands are addressed, including the formation of floating islands, the causes of their buoyancy, their role in the ecology of lakes and wetlands, their flora and fauna, their role in the dispersal of plants and animals, and methods for controlling and managing them. Works are also cited on artificial floating islands used for agriculture, human habitation, wildlife habitat, and improvement of water quality; and floating islands in literature, myth, and legend. The book includes the text and an English translation, with detailed notes, of G. C. Munz's rare 1711 thesis on floating islands, *Exercitatio academica de insulis natantibus*, as well as photographs of several floating islands.

Hardcover, 27 cm, 415 pp. with indices and illustrations.

ISBN 0-9755424-0-0

Library of Congress Control Number: 2004093899

Forthcoming from Cantor Press (Summer 2004)

"Chet Van Duzer has done the long, hard, exhaustive, indepth, multidiscipline, and multilingual 'homework' for all the world's researchers of floating islands, and for others interested in a fascinating natural feature." - Peter A. Stone, Hydrologist, South Carolina Department of Health and Environmental Control, USA.


This ethnobotanical review found that in Norway in the 1700s to the 1800s this abundant marine grass was used variously as manure; stuffing for mattresses; for filling between the logs of wooden houses; as fodder for cows; to prepare fish; and as ground cover for sheep.


Faced with the loss of its favorite food, stinging nettles, local populations of the red admiral butterfly came across a plant with a similar chemistry, baby's tears, a non-native ground cover used in California. The red admiral switched from its native host to the alien plant. In Davis, California, apparently that is not so strange; other butterflies have switched to alien plants too.


Who's helping stem the spread of invasive plants? Here you can read the separate "codes of conduct" against using invasive plants by government, nursery professionals, the gardening public, landscape architects and arboreta and botanic gardens.


Among other plant uses discussed, the claim is that "a house that uses *Cyperus papyrus* for its roof is cooler, and also cheaper to make and maintain than a comparable corrugated roofed house."
Aquatic Weed Training Course - Continued from Page 1

Presentations also were given on general safety issues for people working in the field. These included identification of venomous snakes by the Florida Fish and Wildlife Conservation Commission and information on heat stroke, exhaustion and dehydration by the University of Florida Health Sciences Department.

Reviewed subjects included pesticide safety, *Lygodium* management, ditch bank and upland weed control, biological control of *Melaleuca*, the herbicide registration process, mosquitoes and their relationship to aquatic plant control, as well as updates on active ingredients found in herbicides.

Exams were offered on the last day, and approximately 160 people were tested on core requirements or one of the specialized categories.

The University of Florida is one of the only institutions in the country that offers a Short Course specific to aquatic plant management. The University of Florida's IFAS Center for Aquatic and Invasive Plants is dedicated to research, extension (see sidebar), and education as it pertains to invasive plant management on a local, state, national and international level.

With thousands of certified aquatic pesticide applicators in Florida, we anticipate another successful course in 2005. Every year, a contingent from other countries arrives to learn about management practices for aquatic invasive plants in the United States. We welcome and encourage attendance from those abroad.

Mark your calendars for the 2005 Aquatic Weed Control Short Course: May 16th-20th, 2005, Fort Lauderdale, Florida. See: http://conference.ifas.ufl.edu/aw/

Land-Grant Universities and Extension

Land-grant universities were established by Congress and signed into law by Abraham Lincoln in 1862 with the purpose of educating citizens in agriculture, home economics, mechanical arts, and other practical professions. At that time, more than 50 percent of the U.S. population lived in rural areas, and 30 percent of the workforce was engaged in farming. Land grant institutions received funding and/or grants of land.

There are more than 100 land-grant colleges and universities in the U.S. that help meet public needs by providing practical, applied, non-credit programs called Extension Programs. These programs are provided through thousands of county and regional extension offices to bring land-grant expertise to local levels. Extension was formalized by legislation in 1914 and established the partnership between land-grant institutions and the U.S. Department of Agriculture. Extension was defined as "developing practical applications of research knowledge, and giving instruction and practical demonstrations of existing or improved practices or technologies in agriculture."

During both World Wars and the Great Depression, land-grant institutions and the Extension Service played dramatic roles in the increase of food production, improvements in marketing and preservation of fresh foods, development of buying and selling cooperatives, and the teaching of home economics including nutrition, canning surplus foods, home gardening and poultry production, skills that helped many farm families survive the years of economic depression.

Today, fewer than 2 percent of Americans farm for a living and only 10 percent live in rural areas. Yet the USDA Cooperative Extension Service, together with land-grant universities and colleges, still serves rural, urban, and suburban citizens by teaching agricultural, natural resource, family and community skills at the local level, including aquatic plant management!


The stomachs of 40% of the Amazonian catfish studied contained fruits, infructescences or whole seeds of various plants, including *Alchornea schomburgkiana*, *Licania, Psychotria*, *Bredemeiera*, *Malonetia*, *Ludwigia*, *Oryza* and *Paspatum*. "This result indicates dispersal potential and similar findings have been reported previously for other catfishes."
Books/Reports

(Published by Backhuys Publishers, POB 321, 2300 AH Leiden, THE NETHERLANDS. ISBN 90 5782 142 7. EURO86.00 plus S/H. Email: backhuys@backhuys.com WWW: http://www.backhuys.com)

This large format book, by one of the foremost botanists in the world, is the first ID manual for the aquatic and wetland plants of southern Africa. More than 480 species, subspecies and varieties are fully described with ecological notes, distributions and illustrations. Another 117 species are given shorter treatment.

The author notes that biological diversity, "an objectively measurable parameter," is one criterion that should be used in deciding how to manage and conserve wetlands. As he has reduced botanical terminology to a minimum in this book, he hopes that it will make it easier, "even for the untrained naturalist," to identify aquatic and wetland plants in southern Africa.

(Published by Bureau of Integrated Science Services, Wisconsin Department of Natural Resources, POB 7921, Madison, WI 53707. Free. Phone: 608-266-0531.)

This is the 2nd edition of this award-winning reference and guide, written for farmers and other private landowners who are interested in converting their pastures back into wetlands. It is a very readable, understandable book that is used for training throughout the Great Lake states. Much of its information is applicable elsewhere in the U.S. Chapters cover wetland definitions, assessing potential for restoration, planning the restoration, choosing plants, carrying out the plan, managing the wetland and invasive species, regulation, helpful agencies, monitoring, and case studies.

(Published by the Environmental Law Institute, 1616 P Street NW, Washington, DC 20036. ISBN 1-58576-073-0. US$69.95 plus S/H. WWW: http://www.eli.org)

"This volume reveals that the threat from invasive species is not generally addressed by coherent law and policy. We hope this volume provides a substantial push toward recognizing this serious problem, and toward finding policies that begin to deal with it."

This book describes the law and policy regarding harmful non-indigenous species in six countries - New Zealand ("the only country that has even tried to implement a comprehensive policy . . ."). Germany, South Africa, Argentina, Poland and the U.S. The editors state that 1) in many countries there is basic confusion even over the terminology; 2) most countries have not conducted a comprehensive assessment of the status of non-indigenous species; 3) major legal "gaps" exist in the laws of most countries; and 4) most countries "do not seem to be pursuing dramatic changes in their laws and policies."

(Published by KNNV-uitgeverij, Utrecht @ Stowa, Utrecht, THE NETHERLANDS. ISBN 90 5011 151 3. EUR29.95 plus S/H. WWW: http://www.waterplanten.info)

This field guide in Dutch presents all the known aquatic macrophytes, mosses, stones-tows and macroalgae of The Netherlands and surrounding countries. More than 200 color pictures and 300 line drawings help identify the species. Some information on ecology and management also is given for all species. It is a very nicely produced hardbound field guide-sized book.


Every page of this book meant for students and working biologists is in English and Spanish.

The book treats 134 species of tropical aquatic plants, all of which occur in the Palo Verde National Park, one of the most important swamps of Costa Rica. (The author estimates that about 320 species occur in freshwater aquatic and wetland habitats in Costa Rica.) The book includes 7 keys to the plants. Plants are presented in order of family and each plant is described in terms of habitat, morphology, phenology and distribution. Hundreds of color pictures and drawings accompany the text.

This very well-produced book features more than 700 excellent large color photographs of native and non-native aquatic plants including marginal, floating, bog and submersed plants.

The plants are presented in alphabetical order according to habit. Each of the several hundred species is treated with short non-technical descriptions of how to propagate, plant and care for them, and other notes: "Spiked rush plays well with others, not taking over and killing other plants." The book has no key to the plants.

Considering how much environmental and economic damage non-native aquatic plants are increasingly causing here and elsewhere, it is disconcerting that the authors make little attempt in this book to educate their audience about wise plant selection - many of the plants depicted and discussed are among our worst, and prohibited, non-native invaders - some are unabashedly suggested as useful pond plants. Here was a missed opportunity to help educate aquatic gardeners by separately listing the non-natives, discussing the consequences of using invasive non-natives which might well escape their outdoor aquatic gardens, and suggesting native alternatives to the use of non-natives in outdoor areas large and small.

(Published by Australian Centre for International Agricultural Research (ACIAR), GPO Box 1571, Canberra, Australia 2601. ISBN 0 186 320 374 5. http://www.aciar.gov.au)

"Lantana was the first weed to be targeted for biological control and has been researched longer than any other weed [since 1902]. Yet the program is one of the least successful."

Lantana camara, a pantropical weed, has more than 650 varieties in 60 countries. This book is a summary of what is known about lantana, its taxonomy, and its control, including a comprehensive review of 40() biocontrols which have been developed and released against the plant. It is suggested that biocontrol has had limited success in controlling Lantana camara because of this plant's capacity to hybridize between varieties and closely related species.

(Published by Resources for the Future, 1616 P Street, NW, Washington, DC 20036-1400. ISBN 1-8918532-63-5. WWW: http://www.rff.org)

This book on environmental economics presents ways to use economic theories and mathematics to figure out the various "values" of natural units such as forests and wetlands, and of natural resource services such as pollution control and recreational use of rivers. Referring to economic models, the author attempts to explain that his "major purpose in adding to this literature is to provide a definition and measurement of welfare effects of changes in quantities or qualities of environmental and resource service flows." After he's done this, he attempts to explain how "we use that information to make choices about public policy alternatives." Later, the author gets into describing and evaluating "the currently available methods and techniques for estimating the monetary values of changes in human health that are associated with environmental changes" such as the "marginal value of reduced pollution."

This book full of economic equations is not for the faint-hearted. If you're looking for information about the value of a Scirpus marsh, or the value of a canoeist on a stream, you'll have to do the math - there are no charts of answers here.

(Published by University of New South Wales Press, Sydney, NSW 2052, AUSTRALIA. ISBN 0 86840 632 5. AUS$37.95 (US $26.00), +S/H. WWW: http://www.unswpress.com.au)

About 340 native and non-native plants in Australia are described and pictured in this handbook. The descriptions are short but useful, the pictures are small but colorful. Plants are listed by family; the index is according to scientific and common name. As in the U.S., terms for "types of wetlands" in Australia apparently are numerous. "Damplands," "sumplands," "ephemeral wetlands" and "billabongs" are among wetland types listed in this book.


This is the latest of the book invasion from Island Press. In this work, the author reviews hundreds of primary sources on the subjects of evolution, hybridization and adaptation, especially in relation to invasive species.

This very well-written book includes fascinating chapters on adaptation of plants to alien herbivores and diseases, and adaptation of native herbivores to alien plants in which the author reviews several examples of each. He believes that native species have considerable capacity for evolutionary adaptation to invading species that offer opportunities for exploitation or challenges to survival" and that "the pattern of interaction that develops between alien species and these new enemies can lead to patterns of rapid evolution in both alien and native species."

Continued next page -
Jacksonville epidemic

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AnoPheles

genus mosquitoes as the vector. According
to the author, thus began Florida's war
against mosquitoes.

There are about 170 species of mosqui-
toes in the U.S.; 75 species in Florida.
People who visit places like Flamingo in
the Everglades are simply amazed by the
instant furious onslaught of mosquitoes
that descend on anyone who ventures to
step into the open; imagine the entire state
being like that.

This book recounts the saga of the men
and women who took Florida away from the
mosquitoes - a "heroic and sometimes
tragic story." It is a surprisingly interest-
ing and entertaining book, well-researched
and balanced, and presented in a lively
manner - take it with you to the beach!

( ) WATER AND WETLAND
PLANTS OF THE PRAIRIE
PROVINCES - A Field Guide
for Alberta, Saskatchewan,
Manitoba, and the Northern
United States, by H. Lahrini.

( ) Viscoelasticity of the giant reed
material Arundo donax, by A.E. Lord.
2003. Wood Science and Technology
37(3-4):177-188.

Using highly advanced measurements
and modeling, the authors show why giant
reed "is almost exclusively the material of
choice to manufacture woodwind musical
instrument reeds."

( ) Zero water flows in the carnivorous
genus Genlisea, by L. Adamsen.

Urticularia carnivorous plants have
bladders that suck in their prey, but how is
prey captured in plants of the carnivorous
plant genus Genlisea? This is especially
mysterious considering that in Genlisea
traps there is no water flow, no pumping
to create a vacuum.
FROM THE DATABASE

Here is a sampling of the research articles, books and reports which have been entered into the aquatic, wetland and invasive plant database since Winter 2003.

The database contains more than 63,000 citations. To use the free APIRS database online, go to http://plants.ifas.ufl.edu/ and click on APIRS Online Database.

To obtain articles, contact your nearest state or university library, or a document delivery service.

Anastasiou, C.J., Brooks, J.R.
Effects of soil pH, redox potential, and elevation on survival of Spartina patens planted at a west central Florida salt marsh restoration site.

Andrew, W., Haller, W.T., Shilling, D.G.
Response of St. Augustine grass to fluridone in irrigation water.

Arora, A., Singh, P.K.
Comparisons of biomass productivity and nitrogen fixing potential of Azolla spp.

Bennett, A.C.
Alligator weed (Alternanthera philoxeroides) control in Florida sugarcane.

Boeger, M.R.T., Poulson, M.E.
Morphological adaptations and photosynthetic rates of amphiibious Veronica anagallis-aquatica L. (Scrophulariaceae) under different flow regimes.

Bugbee, G.J., White, J.C., Krol, W.J.
Control of Variable watermilfoil in Bashan Lake, CT with 2,4-D: monitoring of lake and well water.

Busey, P.
Reduction of torpedograss (Panicum repens) canopy and rhizomes by quinclorac split applications.

Chandramohan, S., Charudattan, R., Devalerio, J.T., Hanlon, C.
Use of a multiple-pathogen bioherbicide system for integrated management of torpedograss.

Chapin, C.T., Bridgham, S.D., Pastor, J.
PH and nutrient effects on above-ground net primary production in a Minnesota, USA bog and fen.

Chornesky, E.A., Randall, J.M.
The threat of invasive alien species to biological diversity: setting a future course.

Colmer, T.D.
Long-distance transport of gases in plants: a perspective on internal aeration and radial loss from roots.


De Steven, D., Toner, M.M.
Vegetation of upper coastal plain depressional wetlands: environmental templates and wetland dynamics within a landscape framework.

Effects of epiphyte load on optical properties and photosynthetic potential of the seagrasses Thalassia testudinum Banks ex Konig and Zostera marina L.

Enger, S., Hanson, S.
A summary of permitted control work for aquatic vegetation, algae, leeches, swimmer's itch, 2002.

Erneberg, M., Strandberg, B., Jensen, B.D.
Susceptibility of a plant invader to a pathogenic fungus: an experimental study of Heracleum mantegazzianum (Giant hogweed) and Sclerotinia sclerotiorum.

Farnsworth, E.J., Meyerson, L.A.
Comparative ecophysiology of four wetland plant species along a continuum of invasiveness.

Foxcroft, L.C., Richardson, D.M.
Managing alien plant invasions in the Kruger National Park, South Africa.

Frankart, C., Eullaffroy, P., Vernet, G.
Comparative effects of four herbicides on non-photochemical fluorescence quenching in Lemma minor.

The indicative meaning of diatoms, pollen and botanical macro fossils for the reconstruction of palaeoenvironments and sea-level fluctuations along the coast of Lower Saxony, Germany.

Continued on next page –
Garby, C., Thiebaut, G., Muller, S.
Impact of manual spring harvesting on the regrowth of a spreading aquatic plant: Ranunculus peltatus Schrank.

Biological control of Spartina alterniflora in Willapa Bay, Washington using the planthopper Prokellesia marginata: agent specificity and early results.

Hansen, S.M., Corsini, M.
Program engages the disabled community in stream restoration (Washington).

Hanson, M.L., Sibley, P.K., Mabury, S.A., Muir, D.C.G., et al
Field level evaluation and risk assessment of the toxicity of dichloroacetic acid to the aquatic macrophytes Lemna gibba, Myriophyllum spicatum, and Myriophyllum sibiricum.


Kahara, S.N., Vermaat, J.E.
The effect of alkalinity on photosynthesis-light curves and inorganic carbon extraction capacity of freshwater macrophytes.

Kendig, A., Williams, B., Smith, C.W.
Rice weed control.

Knight, R.L., Gu, B., Clarke, R.A., Newman, J.M.
Long-term phosphorus removal in the Florida aquatic systems dominated by submerged aquatic vegetation.

Koschnick, T.J.
Imagine Florida without aquatic plant management.

Koschnick, T.J.
Tolerance of selected turf and ornamental plants to endotheral in irrigation water.
MASTERT'S THESIS, UNIVERSITY OF FLORIDA, GAINESVILLE, 77 PP. 2003.

Effects of light reduction on growth of the submerged macrophyte Vallisineria americana and the community of root-associated heterotrophic bacteria.

Lindgren, C.J.
Using 1-min scans and stem height data in a post-release monitoring strategy for Galerucella calmariensis (L.) (Coleoptera: Chrysomelidae) on purple loosestrife, Lythrum salicaria L. (Lythraceae), in Manitoba.

Constructed wetlands in detention ponds: improving water quality and preventing harmful algal blooms.

The influence of formulation, buffering, pH and divalent cations on the activity of endotheral on hydrilla.

Maclellan, C.M.O., Ralph, P.J.
Short-term response and recovery of Zostera capricorni photosynthesis after herbicide exposure.

McIntosh, D., King, C., Fitzsimmons, K.
Tilapia for biological control of giant salvinia.

Morgan, K.L., Roberts, T.H.
Characterization of wetland mitigation projects in Tennessee, USA.

Murphy, I.R., Kinsey, S.T., Durako, M.J.
Physiological effects of short-term salinity changes on Ruppia maritima.

Nakata, P.A., Kostman, T.A., Franceschi, V.R.
Calreticulin is enriched in the crystal idioblasts of Pistia stratiotes.

Herbicides and prescribed burning for control of Phragmites australis at St. Johns Marsh, Michigan.

Palmer, M.L., Mazzotti, F.J.
Structure of Everglades alligator holes.

Patten, K.
Persistence and non-target impact of imazapyr associated with smooth cordgrass control in an estuary.
On the use of sediment fertilization for seagrass restoration: a mesocosm study on
Zostera marina L.

Poe, A.C., Piehler, M.F., Thompson, S.P., Paerl, H.W.
Denitrification in a constructed wetland receiving agricultural runoff.

Effect assessment of antimicrobial pharmaceuticals on the aquatic plant Lemma
minor.

Ray, S., Klenell, M., Choo, K.-S., Pedersen, M., et al
Carbon acquisition mechanisms in Chara
tomentosa.

Treatment of atrazine in nursery irrigation runoff by a constructed wetland.

Sammons, S.M, Maceina, M.J., Partridge, D.G.
Changes in behavior, movement and home
ranges of largemouth bass following
large-scale hydrilla removal in Lake Semi-
nole, Georgia.

Sanford, M.R., Keiper, J.B., Walton, W.E.
The impact of wetland vegetation drying
time on abundance of mosquitoes and
other invertebrates.

Scherder, E.F., Ronald, T.E., Michael, L.L., Jamie, B.D.
Rice (Oryza sativa) response and barn-
yardgrass (Echinochloa crus-galli) control
under an intermittent flooding system:
IN: WSSA ABSTRACTS, WEED SCI. SOC. OF

Smith, C.W., Dilday, R.H., Eds.
Rice: origin, history, technology, and
production.
JOHN WILEY & SONS, INC., HOBOKEN, NJ, 642
PP. 2003.

Soltan, M.E., Rashed, M.N.
Laboratory study on the survival of water
hyacinth under several conditions of heavy
metal concentrations.

Steinmann, C.R., Weinhart, S., Meizer, A.
A combined system of lagoon and con-
structed wetland for an effective waste-
treatment.

Stirk, W.A., Van Staden, J.
Occurrence of cytokinin-like compounds
in two aquatic ferns and their exudates.

Strong, G.L., Fischer, A.J.
Imposed drought: a tool to reduce the
competitive impact of ricefield bursh in
organic rice.
IN: WSSA ABSTRACTS, WEED SCI. SOC. OF
AMERICA, VOL.43, ED. R.J. KREMER, JACKSON-

Sullivan, T.
The Lake Rousseau Sonar (fluridone) drip
treatment.

Tracy, M., Montante, J.M., Allenson, T.E., Hough, R.A.
Long-term responses of aquatic macro-
phyte diversity and community structure to
variation in nitrogen loading.

Van Nes, E.H., Scheffer, M., Van Den
Berg, M., Coops, H.
CHARISA: a spatial explicit simulation
model of submerged macrophytes.

Wang, G., Lin, Y., Li, W., Kohara, H.,
et al
Mutation in acetolactate synthase gene of
sulfonyleurea-resistant biotype of Mono-
choria korsakowii, an annual paddy weed
in Japan.
IN: WSSA ABSTRACTS, WEED SCI. SOC. OF
AMERICA, VOL.43, ED. R.J. KREMER, JACKSON-

Webster, E.P., Leon, C.T., Zhang, W.
Weed control and water management
strategies for herbicide-tolerant rice.
IN: WSSA ABSTRACTS, WEED SCI. SOC. OF
AMERICA, VOL.43, ED. R.J. KREMER, JACKSON-

Willis, J.M., Hester, M.W.
Interactive effects of salinity, flooding, and
soil type on Panicum hemitomon.

Yokota, E., Shimmen, T.
Possible involvement of energy metabo-
llism in the change of cytoplasm organization
induced by a protein phosphatase inhibi-
tor, Calyculin a, in root hair cells of
Linnobium stoloniferum.

Zhang, Z., Elsohly, H.N., Li, X.-C.,
Khan, S.I., et al
Phenolic compounds from Nymphaea
oboroda.

*Species targeted habitat restora-
tion: a mitigation option within
identified historical habitat and
critical habitat area, by C.
of the 30th Annual Conference on
Ecosystems Restoration and
Creation, Hillsborough Community
College, Tampa, pp. 63-69.
Within the city limits of West
Palm Beach, Florida, rather than
build houses on 600 acres in
endangered Everglades snail kite
habitat, and to settle a suit brought
by the National Audubon Society
and The Sierra Club, 300 acres were
given to human house-building
and 300 acres were given to the
snail kite. After extensive work to
remove invasive plants and to re-establish
cypress heads and marshes, and
otherwise to restore the area to pre-
1942 conditions, the snail kite has
returned to the area.
MEETINGS

SOUTH CAROLINA AQUATIC PLANT MANAGEMENT SOCIETY (SCAPMS).
Contact: http://www.scapms.org/

AQUATIC WEEDS – THREAT TO ENVIRONMENT OR BOON IN DISGUISE
A national workshop sponsored by the All India Council for Technical Education in association with the College of Technology and Engineering, Udaipur.
Contact: Dr. S.M. Mathur, College of Technology and Engineering, Maharana Pratap University of Agriculture and Technology, Udaipur (Rajasthan) - 313 001, India, Phone: 0294-2470119, Fax: 0294-2471056, E-mail: shiloo592003@yahoo.co.uk

13th INTERNATIONAL CONFERENCE ON AQUATIC INVASIVE SPECIES.
Contact: Elizabeth Muckle-Jeffs, E-mail: profedge@renc.igs.net WWW: http://www.aquatic-invasive-species-conference.org/

8th CONFERENCE OF THE INTERNATIONAL SOCIETY FOR PLANT ANAEROBIOSES (ISPA).
The ISPA is composed of scientists interested in the mechanisms of acclimation and adaptation of plants to poorly aerated environments. Plants studied include those inhabiting marine, aquatic, salt marsh, and wetland environments; and terrestrial ecosystems subjected to seasonal episodes of waterlogging or submergence (including crop species and agricultural systems).
Contact: Tim Colmer, University of Western Australia, School of Plant Biology, 35 Stirling Highway, Crawley 6009 WA, Australia, E-mail: tcolmer@cyllene.uwa.edu.au WWW: http://www.ibba.cnrs.org/ispa/

MIDSOUTH AQUATIC PLANT MANAGEMENT SOCIETY (MSAPMS).
Contact: http://www.msapms.org/

31st NATURAL AREAS ASSOCIATION.
Emerging issues: Possibilities & Perils is the theme of the 2004 meeting. Symposia and plenary sessions will focus on emerging problems and creative strategies to preserve biological resources for the future.
Contact: http://www.naturalarea.org/

FLORIDA AQUATIC PLANT MANAGEMENT SOCIETY (FAPMS).
Contact: http://www.fapms.org/

ECOSYSTEMS RESTORATION AND CREATION 31ST ANNUAL CONFERENCE.
This conference provides a forum for the nationwide exchange of results of the latest research on restoration, creation and management of all ecosystems, upland to freshwater to coastal.
Contact: http://www.hccfl.depts/detp/ecoconf.html

24th INTERNATIONAL SYMPOSIUM - NALMS 2004 (NORTH AMERICAN LAKE MANAGEMENT SOCIETY)
Contact: NALMS, PO Box 5443, Madison, WI 53705-0443, Phone: 608/233-2836; Fax: 608/233-3186. E-mail: nalms@nalms.org WWW: http://www.nalms.org/

66th ANNUAL MEETING, ASSOCIATION OF SOUTHEASTERN BIOLOGISTS.
Contact: Scott Jewell, Phone: 336/421-0034; Email: a2zconvention@yahoo.com; WWW: http://www.asb.appstate.edu

Meetings continued next page –

* Hemlock water dropwort (*Oenanthe crocata*), dead man's fingers. 2001. IACR-Center for Aquatic Plant Management, England, CAPM Information Sheet 34.
This aquatic plant is "the most toxic plant in Britain to both humans and animals" - the leaves smell like celery or parsley, and are celery-like in form - horses, cows and humans mistake it for lunch.
44th Annual Aquatic Plant Management Society Meeting - A Report

Tampa, Florida was the host city for the 44th Annual Aquatic Plant Management Society (APMS) meeting held July 11th-14th. 220 delegates attended, including 18 students, to learn the latest in aquatic plant management from 49 papers and 23 posters. Nine of the presentations were given by students in the annual student paper competition. Seven of the students are working on their Ph.D. and two on their Master’s degree.

Sarah Habrun of the College of Charleston won the student competition for her presentation, Investigation of a Novel Cyanobacteria Linked to Avian Vacuolar Myelinopathy (AVM). AVM is a fatal bird disease and Ms. Habrun states that “the most probable hypothesis is that birds ingest a neurotoxin produced by epiphytic cyanobacteria.” The toxic cyanobacteria has been closely associated with Hydrilla verticillata in reservoirs in the southeastern U.S., and has already adversely affected local breeding populations of American bald eagles.

All student presenters received a copy of C.D. Sculthorpe’s The Biology of Aquatic Vascular Plants, or the text of their choice.

Linda Nelson and Judy Shearer from the U.S. Army Engineer Research and Development Center, Environmental Laboratory won the poster competition with their poster, “Integrating Triclopyr and a Fungal Pathogen (Mycoleptodiscus terrestris) for Control of Eurasian Watermilfoil (Myriophyllum spicatum).” The pair received a perfect score from a judging panel of student attendees.

A variety of interesting presentations were given, including economic studies, updates on biological and chemical control methods, ecological studies, and a special session on plant resistance and tolerance to aquatic herbicides.

Dr. T. Wayne Miller, Jr., founder of the APMS (originally known as the Hyacinth Control Society), presented his recollections from approximately 40 years of aquatic plant management experience beginning in 1960. He displayed a photograph of water hyacinths blocking access to a boat dock in Lee County, Florida from a 1960 edition of The Saturday Evening Post (see below) that inspired county commissioners to create the first hyacinth control program in the nation.

A review from regional APMS chapters was given, including Florida, Midsouth, Midwest, Northeast, Texas, and South Carolina. Chapter membership numbers range from less than 100 to approximately 500 in the Florida chapter. The APMS and most regional chapters award student scholarships in aquatic plant sciences yearly.

The 45th Annual APMS meeting will be held in San Antonio, Texas. See www.apms.org for more information on all APMS activities and events.

K.B.
Aquaphyte is the newsletter of the Center for Aquatic and Invasive Plants and the Aquatic, Wetland and Invasive Plant Information Retrieval System (APIRS) of the University of Florida Institute of Food and Agricultural Sciences (IFAS). Support for the information system is provided by the Florida Department of Environmental Protection, the U.S. Army Corps of Engineers Waterways Experiment Station Aquatic Plant Control Research Program (APCRP), the St. Johns River Water Management District and UF/IFAS.

EDITORS: Victor Ramey
Karen Brown

Aquaphyte is sent to managers, researchers and agencies in 71 countries around the world. Comments, announcements, news items and other information relevant to aquatic and invasive plant research are solicited.

Inclusion in Aquaphyte does not constitute endorsement, nor does exclusion represent criticism, of any item, organization, individual, or institution by the University of Florida.

Aquaphyte Manufacturer Comes Through Again!

Mr. Bill Moore of Cerexagri, manufacturer of the aquatic herbicide Aquathol, presents a check to Mr. Vic Ramey of the UF-IFAS Center for Aquatic and Invasive Plants. The $15,000 unrestricted contribution will be used by the Information Office in the production of educational materials for aquatic plant management personnel as well as for students and the general public.

This is the sixth such contribution from Cerexagri to the Center’s Information Office in recent years. Mr. Gerald Adrian is the company’s Aquatic Sales Manager, and Mr. Moore is the company’s Florida representative.

Previous contributions included seed money for the Office’s line-drawings project and plant photography collection, the aquatic plant identification deck and the laminated photo-murals for schoolteachers. Such unrestricted support from private sources enables the Office to do much more than it could with base funding alone.

We greatly appreciate it!