A Q U A P H Y T E

A Newsletter about Aquatic, Wetland and Invasive Plants

Center for Aquatic and Invasive Plants
with support from
The Florida Department of Environmental Protection,
Bureau of Invasive Plant Management
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Invasives Information Retrieval System

The **APIRS** office, long known for its information gathering and dissemination relating to aquatic plants, native and non-native, has widened its focus to include invasive plants of uplands as well. In fact, the research center of which **APIRS** is a part has changed its name to the Center for Aquatic and Invasive Plants. Many of the researchers associated with the Center are already well known for their work on invasive plants.

As a first step, **APIRS database manager**, Karen Brown, and reader, Mary Langeland, have begun collecting the literature of the invasive plants on the two lists of the Florida Exotic Pest Plant Council (FLEPPC), as well as the Noxious Weed List of the Florida Department of Agriculture and Consumer Services (FDOACS). The FLEPPC lists are Category I plants (that are invading and disrupting native habitats, 65 species) and Category II plants (that have shown a potential to disrupt native habitats, 60 species). **(FLEPPC: http://www.fleppc.org)** The FDOACS lists 63 species, some of which are in common with the FLEPPC lists. **(FDOACS: http://fdoacs.state.fl.us/~pi/noxioustbl.htm)**

Support is being sought to expand our information gathering and dissemination capabilities more quickly, so that the literature on additional plants on "invasives and noxious lists" of other states and countries can be collected, cataloged, disseminated and used.

Already, several hundred researchers routinely contribute their articles and reports for inclusion in the **APIRS** system and database. Other researchers and authors who work on invasive plants, and who may not be aware of our established system, are encouraged to join our modest partnership. Works will be entered into our science library and central source for aquatics and invasives literature. In exchange, our information and referral services will remain free of charge to our contributors, as they have been for the past 18 years. For more information, contact Karen Brown at kpb@gnv.ifas.ufl.edu

As was the case for aquatic plants, projects manager Victor Ramey is building a thorough **collection of photographs and line drawings** of invasive plants. These and other resources are being used to develop all kinds of information and education products, from museum backdrops to ID decks, from invasives posters to coloring books, from magazine articles to homeowner slide shows.

And, of course, our **web site** is expanding its content as well. So far, fairly extensive information about 16 invasive plants is online at our site. There also are pictures and drawings of a number of other invasive plants. See it all at: **http://plants.ifas.ufl.edu**

APIRS has a new color catalog with full descriptions of our free and for-sale products and services. Included are database instructions, lists of plants featured in various publications, full lists of available slides and drawings, and ordering information. Contact the **APIRS** office for a copy of the new catalog: varamey@nersp.nerdc.ufl.edu

Burma reed
Neyraudia reynaudiana
Photo by Ann Murray

Invasive Plants

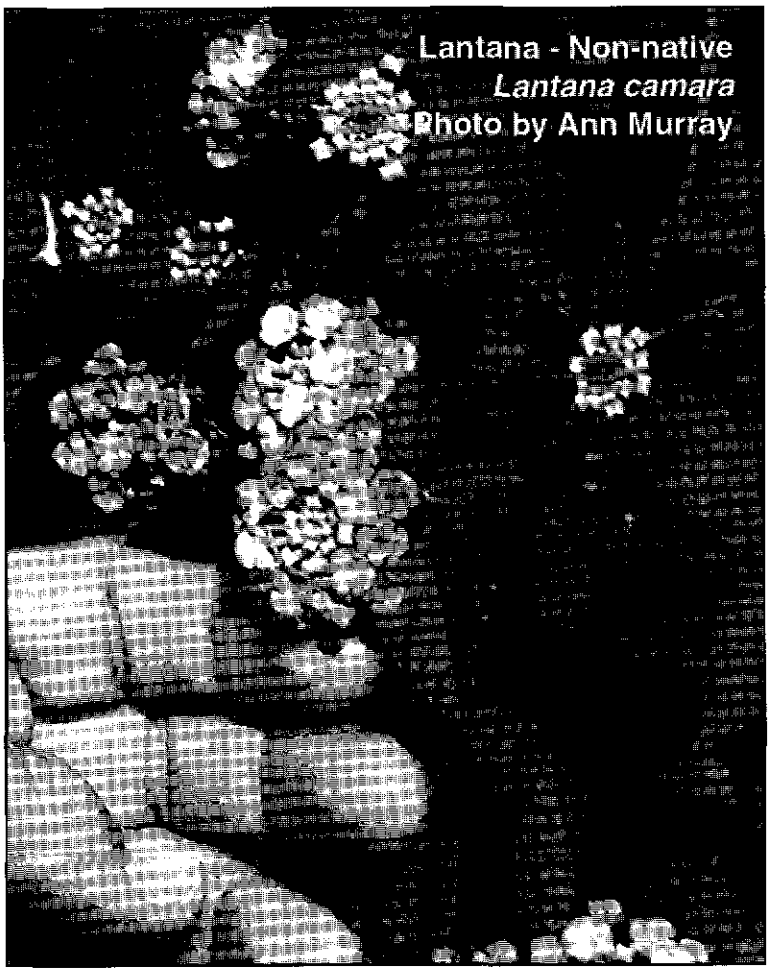
Lantana, shrub verbena
Lantana camara L.

Lantana camara L. - *deciduous shrub* to 6 ft tall; **stems** square, covered with bristly hairs, often with thorns and/or small prickles; **leaves** opposite, simple, with petioles (leaf stems) strongly aromatic; **leaf blades** oval, rough, hairy to 6 in. long to 2.5 in. wide, veins conspicuous; **leaf margins** coarsely serrate; **inflorescense** a stalked dense cluster of flowers; **flowers** small, multicolored, in a single cluster, may be white to pink or lavender, yellow to orange or red, color changing over time; **fruit** small, round, fleshy, 2-seeded drupe, green turning purple to blue-black.

"There grow on this island many curious shrubs, particularly a beautiful species of lantana. It grows in coppices in old fields, about five or six feet high, the branches adorned with rough serrated leaves, which sit opposite, and the twigs terminated with umbelliferous tufts of orange-colored blossoms, which are succeeded by a cluster of small blue berries; the flowers are of various colors, on the same plant, and even in the same cluster, as crimson, scarlet, orange and golden yellow; the whole plant is of a most agreeable scent."

from *The Travels of William Bartram,* his observations of lantana in 1773 while exploring the islands of Lake George in northern Florida.

***Lantana camara*, lantana, and its many cultivated varieties, has a mixed reputation.** On one hand, lantana is listed by Holm *et al.* as one of the worst weeds in all the world: a thicket-forming menace in 47 countries that has "infested millions of hectares of natural grazing lands" (especially in Asia and Africa) and that is a weed in 14 major crops including coffee, oil palms, coconuts, cotton, bananas, pineapples, sugarcane, sandalwood, tea, rubber and rice. In Indonesia, lantana is the most dominant species among 54 species found on the east slope of the Candikuning pine plantation. Reportedly, in India the lantana invasion in some places has been so complete as to require the moving of several entire villages. In Hawaii, several hundred thousand acres are infested with lantana; lantana infests four million acres in Australia. What's more, *Lantana camara* leaves and fruit (green and mature) are very toxic, having been blamed in the deaths of animals as diverse as livestock, parrots, rabbits and snakes, as well as humans.



On the other hand, *Lantana camara* and its varieties are frequently planted in the U.S. to attract butterflies, is planted to herald the arrival of spring at Boston Garden, and is still considered one of the "10 favorite plants of Malaysians." In the US, some nurseries tout lantana as a native plant; it is sold over the internet from companies in Ohio, Texas and New Mexico. According to Indian research, there is evidence that lantana extracts could be used for weed control in rice.

Notwithstanding Bartram's observations of lantana in Florida more than 200 years ago, *Lantana camara* is listed as a Category I non-native, invasive plant by the Florida Exotic Pest Plant Council (FLEPPC). (However, lantana is not listed on the Noxious Weed List of the Florida Department of Agriculture and Consumer Affairs (FDACS).) FLEPPC believes lantana to be a native of the West Indies, not of Florida. Others believe it to be from Argentina.

***Lantana camara* grows well in full-sun disturbed places, but also grows well under shade.** It is a long-lived plant, and can form dense thickets in pastures, forests and along fence lines. It prefers well-drained soils, and, once established, requires only infrequent watering. It is spread by birds as well as humans. Lantana leaves are damaged at 27 degrees F. Lantana is allelopathic; it releases chemicals into the soil to prevent other plants from germinating. Lantana is not easy to control. Experience shows that burning, cutting and digging lantana often results in increased germination and more shoot growth. As for biological control possibilities, various arthropods and fungal pathogens have been or are being tested.

Florida's case is complicated by the fact that this state has at least two species of lantana believed to be native: *Lantana depressa*, Florida lantana, and *Lantana involucrata*, wild sage. Florida lantana, an endangered plant, has yellow flowers and tapered leaves. It is believed that *Lantana camara* hybridizes with Florida lantana, thus contaminating the Florida lantana gene pool. It is not easy to tell just by looking whether a plant is a 100% *Lantana camara* or a 50% *Lantana depressa*. Sales and plantings of lantana hybrids of many colors further complicate the scenario. The other lantana native to Florida, wild sage (*L. involucrata*), is decidedly less showy, having small whitish yellow-centered flowers and smaller, rounder leaves. Finally, another non-native lantana, *Lantana montevidensis*, trailing lantana, is sold to homeowners throughout the state. Its all-mauve lantana flowers are becoming more familiar, although *L. montevidensis* does not seem to be invasive.

Some references from the **APIRS** invasive plant database:

Gentle, C.B. and J.A. Duggin. 1997. Allelopathy as a competitive strategy in persistent thickets of *Lantana camara* L. in three Australian forest communities. Plant Ecology 132: 84-95.

Greathead, D.J. 1973. Progress in the biological control of *Lantana camara* in East Africa and discussion of problems raised by the unexpected reaction of some of the more promising insects of *Sesamum indicum*. pp. 89-92 in Dunn, P.H. (ed.), Proc. 2nd Int. Symp. Biol. Control Weeds. *Comm. Inst. Biol. Control Misc. Publ.* 6. 225 pp.

Holm, L.G., Plucknett, D.L., et al. 1977. The world's worst weeds - distribution and biology. University Press of Hawaii. 609 pp.

Langeland, K.A. and Craddock Burks, K. (eds.) 1998. Identification & biology of non-native plants in Florida's natural areas. University of Florida, Gainesville. 165 pp.

Wolfson, S.L. and T.W. Solomons. 1964. Poisoning by fruit of *Lantana camara*. Am J. Dis. Child, 107: 109-112.

Jess VanDyke
at Lake Jackson sinkhole
Photo by Ann Murray

No Aquatic Weeds On Jackson Prairie

Outstanding Florida Water Body, Lake Jackson (Tallahassee), is known nationally as a premiere bass fishing lake. And over the years, aquatic weed and water quality concerns in the lake have been the subject of countless homeowners' meetings and of primary interest to lake management personnel. However, its bass reputation and aquatic weed problems became much less consequential on September 16 when a sinkhole suddenly drained more than half the lake of every last gallon of water, not to mention every last fish and alligator. It is now possible to walk from shore to shore--but steer clear of the sinkhole.

Jess VanDyke, long-time regional biologist with the Bureau of Invasive Plant Management (Florida Department of Environmental Protection) was there when it happened. "It was spectacular: animals trying to scramble out; a whirlpool of gators, birds and bass went down the hole," said VanDyke. Lake Jackson is one of Florida's disappearing lakes, lakes with sinkholes that are known to drain periodically. Lake Jackson, for example, has drained 4 times previously in the 20th century, in 1907, 1933, 1957, 1982 and now in 1999.

"Our records show that in 1982 the lake refilled from rainfall within about 6 months. In 1957 there was a drought, so it took much longer to refill. It's all about long term rainfall patterns," says VanDyke. It is expected that the lake will eventually collect water and again become a top-notch fishing lake.

For more information, contact Jess VanDyke, the regional biologist for the northwest Florida region (which includes Lake Jackson), at Bureau of Invasive Plant Management, 3915 Commonwealth Blvd., Tallahassee, FL 32399; (850) 487-2600. E-mail: Jess.VanDyke@dep.state.fl.us

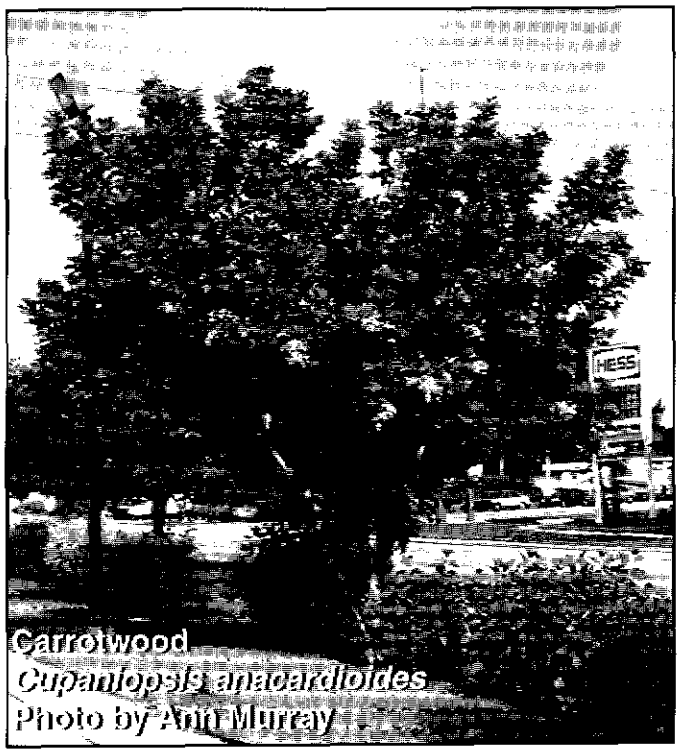
For more pictures, go to our website: http://plants.ifas.ufl.edu/depguys.html

Florida Ag Adds 11

Eleven terrestrial weeds were recently added to the official "Noxious Weed List" of the Florida Department of Agriculture and Consumer Services (FDOACS). The Noxious Weed List prohibits introducing, possessing, moving, growing and selling these species. The full list can be seen at **http://doacs.state.fl.us/~pi/noxioustbl.htm**

The 11 new terrestrial weeds added to the official noxious weeds list are:

Air potato (*Dioscorea bulbifera*)
Burma reed (*Neyraudia reynaudiana*)
Carrotwood (*Cupaniopsis anacardioides*)
Downy rose myrtle (*Rhodomyrtus tomentosa*)
Japanese climbing fern (*Lygodium japonicum*)
Kudzu (*Pueraria montana*)
Small-leaved climbing fern (*Lygodium microphyllum*)
Sewer-vine (*Paederia cruddasiana*)
Skunk-vine (*Paederia foetida*)
Wetland nightshade (*Solanum tampicense*)
White yam (*Dioscorea alata*)



Carrotwood
Cupaniopsis anacardioides
Photo by Ann Murray

Nurserymen Give Up 11

The Florida Nurserymen and Growers Association (FNGA) has decided to encourage its members to voluntarily phase out the growing and selling of 11 species of plants identified as being invasive in Florida. The 11 came from a list of especially invasive plants as determined by the Florida Exotic Pest Plant Council (FLEPPC). The full list can be seen at **http://www.fleppc.org** Ten of these plants are *not* officially banned by the state of Florida, carrotwood being the exception.

The 11 plants the nurserymen have agreed to phase out are:

Woman's tongue (*Albizia lebbeck*)
Orchid tree (*Bauhinia variegata)*
Bischofia (*Bischofia javanica*)
Carrotwood (*Cupaniopsis anacardioides*)
Cat's claw vine (*Macfadyena unguis-cati*)
Chinaberry (*Melia azedarach*)
Sword fern (*Nephrolepis cordifolia*)
Guava (*Psidium guajava*)
Oyster plant (*Rhoeo spathacea*)
Java plum (*Syzygium cumini*)
Seaside mahoe (*Thespesia populnea*)


Chinaberry
Melia azedarach
Photo by Ann Murray

Other plants sold by nurseries, such as lantana, ardesia and nandina, also have been declared to be invasive by the FLEPPC. The nurserymen have not agreed to cease selling them. But that's another story.

Books/Reports

PLANT INVASIONS -- Studies from North America and Europe, edited by J.H. Brock, M. Wade, P. Pysek and D. Green. 1997. 224 pp.

(Order from Backhuys Publishers, POB 321, 2300 AH Leiden, The Netherlands. US$52.75 plus S/H. Email: backhuys@euronet.nl WWW: http://www.euronet.nl/users/backhuys)

"When an alien plant(s) overtakes the native vegetation and essentially develops a monoculture, it can be said that the environment of that area has changed... Management attempts that extol eradication of these alien species most likely will be futile... Existing vegetation management tools will effectively control alien invasive plants if there is both the political and social concensus for vegetation management." Included are 19 papers on various invasive plants in the U.S. and Europe written by scientists well-known for their work on invasive plants.

PLANT INVASIONS -- Ecological Mechanisms and Human Responses, edited by U. Starfinger, K. Edwards, I. Kowarik and M. Williamson. 1998. 362 pp.

(Order from Backhuys Publishers, POB 321, 2300 AH Leiden, The Netherlands. US$97.00 plus S/H. Email: backhuys@euronet.nl WWW: http://www.euronet.nl/users/backhuys)

"Adventive floristics" is a term from the 19th century which refers to plant invasion studies. Although "non-native plant invasions" only recently have become important environmental news in the United States, Europeans have much experience in their study. This volume includes papers presented at the 4th International Conference on the Ecology of Invasive Alien Plants, 1-4 October 1997, in Berlin. Twenty-two of the chapters are case studies of invasive species, from Russian olive invasion of Arizona to the invasion of *Impatiens glandulifera* in Poland; from the invasion of North American blueberry hybrids in Germany to the spread of a tropical alga in the Mediterranean Sea. Several essays about aspects of plant invasions also are included.

EXOTIC PESTS OF EASTERN FORESTS, edited by K.O. Britton. 1997. 198 pp.

This is the proceedings of the Exotic Pests of Eastern Forests Conference, Nashville, Tennessee, April 8-10, 1997. Papers discussing exotic plants, insects and diseases are presented, forming a basic overview of the exotic species threat in the United States, and who, in 1997, were doing something about it.

HARMFUL ALGAE, edited by B. Reguera, J. Blanco, M.L. Fernandez and T. Wyatt. 1998. 635 pp.

(Order from Centre on Harmful Algae, Instituto Espanol de Oceanografia, Centro Oceanografico de Vigo, aptdo 1552 Vigo, 36080 Pontevedga, Spain. E-mail: vigohab@vi.ieo.es)

This is the (huge) proceedings of the VIII International Conference on Harmful Algae, Vigo, Spain, June 25-29, 1997. It includes many scientific descriptions of harmful algae events such as toxic blooms of cyanobacteria; ciguatera dinoflagellates; shellfish killers PSP, DSP and ASP; and fish killing and manatee killing algae such as *Gymnodinium breve*. Included are other large sections on population dynamics and ecology of harmful algae; their monitoring and management; their taxonomy and identification; their toxin production and degradation; their interactions with other organisms; the uptake and biotransformation of toxins by shellfish; toxin descriptions and detection methods; and the toxic mechanisms of the algae.

THE BIOLOGY OF STREAMS AND RIVERS, by P.S. Giller and B. Malmqvist. 1998. 296 pp.

(Order from Oxford University Press, 198 Madison Avenue, New York, NY 10016-4314. Cloth: $85 plus S/H Paperback: $35 plus S/H)

This book, a comprehensive overview written as an undergraduate text, provides more than a glimpse of the life below the water surface of streams and rivers. It "delves into the rich and growing literature and provides an up-to-date introduction to stream and river biology." The authors describe the different kinds of watercourses; outline the range of living organisms of rivers, and their adapations; discuss population, community and ecosystem patterns and processes such as energy flow and secondary production; and discuss applied issues such as the effects of pollution, tourism, sport fishing and exotic species.

STONEWORTS--Valuable for Water Management, by M.S. Van den Berg and H. Coops. 1999. 40 pp.

(Order from Harry Hosper, RIZA, POB 17, NL-8200 AA Lelystad, The Netherlands.)

It is well known that water plants make water clear. Even in very nutrient rich lakes, where the water is generally murky green with free-floating algae, the water may be crystal clear within and above submersed plant beds. In this book, Dutch researchers compare the underwater stoneworts, such as *Chara* species, with other species to identify plants which might keep the water clear, but which at the same time would cause relatively little nuisance to swimmers, skiers and boaters. They found that the stoneworts have a "particularly great effect on the surrounding waters", having "a major influence on the clarity of the water." Stoneworts also benefit animals, especially birds, fish and amphibians. The message: selectively manage for stoneworts.

LIVING AT THE LAKE -- A Handbook for Florida Lakefront Property Owners, by M. Bachmann, M. Hoyer and D.E. Canfield, Jr. 1999. 182 pp.

(Order from IFAS Publications, POB 110011, Gainesville, FL 32610-0011. (800) 226-1764. $15.00 plus S/H.)

A book long needed in Florida, this is "the definitive introduction to lakeside living." It includes information on selecting lakeside property for specific needs and lifestyles; real-English explanations of government rules and regs; an introduction to lake plants and animals; information about the numerous federal and state agencies -- information and inspiration for those who live (or who want to live) on one of Florida's 7,000 lakes.

HUDSON RIVER FIELD GUIDE TO PLANTS OF FRESHWATER TIDAL WETLANDS, by New York State Department of Environmental Conservation, illustrated by L.B. McCloskey. 1998. 50 pp.

(Order from Hudson River National Estuarine Research Reserve, c/o Bard College Field Station, Annandale, NY 12504. (914) 758-7010.)

Meant for weekend marsh explorers, this very beautifully illustrated handbook treats 4 submersed, 1 floating, and 18 emersed plants of the tidal Hudson River. The line drawings illustrate how the plants appear in different stages throughout the year, and in many cases include microscopic enlargements of important features. Text for each plant briefly notes distinctive characteristics and habitat. As nice as the book is, the best part is that apparently it is free of charge.

ATLAS OF RUSSIAN WETLANDS--Biogeography and Metal Concentrations, by A.V. Zhulidov, J.V. Headley, R.D. Robarts, A.M. Nikanorov and A.A. Ischenko. 1997. 309 pp.

(Order from Dr. Richard D. Robarts, National Water Research Institute, Environment Canada, 11 Innovation Blvd., Saskatoon, SK, CANADA S7N 3H5. E-mail: richard.robarts@ec.gc.ca)

This clearly written, carefully produced, well indexed, good looking and easy-to-follow large-format book is a "comprehensive compilation of wetland ecosystems of 13 major ecological regions of Russia that extend from polar to subtropical regions and across some 6,500 km from Europe to the Pacific Ocean," and includes detailed summaries of their topographical, hydrological, climatic, and surface water and wetland features. Maps, tables and photographs abound.

THE BIOLOGY OF LAKES AND PONDS, by C. Bronmark and L. Hansson. 1998. 216 pp.

(Order from Oxford University Press, 198 Madison Avenue, New York, NY 10016. $35.00 paper; $85.00 cloth.)

This is an introductory text to aquatic ecology and limnology. Though the book is by two Swedish researchers, the focus is on "the general patterns in adaptations and processes among organisms of lakes and ponds", patterns which apply to lakes throughout the world. The authors especially seek to present "what we think is interesting and important to know for an aquatic ecologist at the begining of his or her career." Chapters include "The abiotic frame and adaptations to cope with abiotic constraints"; "The organisms: the actors within the abiotic frame"; "Biotics: competition, herbivory, predation, parasitism, and symbiosis"; "Food web interatcions in freshwater ecosystems"; and "Environment and conservation".

THE HUMANURE HANDBOOK, by J. Jenkins. 1999. 305 pp.

(Order from Chelsea Green Publishing, POB 428, White River Junction, VT 05001. (800) 639-4099.)

Another Y2K worry: what to do if the toilets don't flush. First of all, according to the author, an organic gardener, human excrement is not a waste material, it's a resource material. Beginning with an essay on wasteful humans, this treatise on human waste eventually tells us what to do if and when the Y2K bug backs up your toilet. Or if and when you decide to start using this valuable resource. Suffice to say this is a mature discussion about "composting humanure, an act of humility". If you're into it, and have the time and the acreage, this book is full of detailed and scientific answers on what to do, a well-written and entertaining manual.

INVASIVE PLANTS - Changing the Landscape of America - Fact Book, by R.G. Westbrooks and the Federal Interagency Committee for the Management of Noxious and Exotic Weeds. 1998. 107 pp.

(Order from U.S. Department of Agriculture, Natural Resources Conservation Service, Plant Materials Center, 14119 Broad Street, Brooksville, FL 34601. (352) 796-9600.)

This large format, glossy color book begins with essays on "understanding the problem" of invasive plants. It then describes invasive plants in more than a dozen different situations, croplands to private preserves. This is certainly not an identification manual (no morphological descriptions, too-small pictures...); rather, each plant is described in terms of ecologic and economic impacts as weeds in the United States. Lots of facts!

USE WATER HYACINTH! A Practical Handbook of Uses for the Water Hyacinth from Across the World, by K. Lindsey and H.-M. Hirt. 1999. 115 pp.

(Order from Anamed, Schafweide 77, 71364 Winnenden, Germany. E-mail: keith_lindsey@hotmail.com. $15 plus S/H.)

Lake Victoria, Africa, has 10,000 hectares of water hyacinths, "an immediate catastrophe." The authors state, "There are strong pressures and voices for and against the use of chemicals. It is imperative that alternatives are found....Conventional voices propose utilization as being merely ancillary to the real task of control, which must be tackled by chemical, biological or mechanical means. We disagree." Regarding chemical control of water hyacinths by 2,4-D and glyphosate, the authors state: "Chemical control is rapid and effective. It is also costly and environmentally disastrous."

The book presents good descriptions of water hyacinth, its growth, problems it creates and its control, and a good history of its spread. It also presents descriptions of how to use water hyacinth to produce compost, hay and silage; pig, rabbit and fish food; rope, crafts and furniture; briquettes and biogas; paper and boards; and building materials. The book includes a listing of several organizations and companies which are said to produce things from water hyacinths.

SIGNIFICANT HABITATS AND HABITAT COMPLEXES OF THE NEW YORK BIGHT WATERSHED, by the U.S. Fish and Wildlife

Service, Southern New England-New York Bight Coastal Ecosystems Program. 1997. CD-ROM .
(Order by E-mail: r5es_snenybcep@mail.fws.gov Free.)

This 1,025-page study of the New York Bight watershed (20 million acres or 31,000 sq. miles) "focuses on the identification and description of essential habitats of key marine, coastal and terrestrial species inhabiting the watershed study area in order to help guide informed and ecologically sound land use decisions and land protection efforts." Over 1,000 species of special emphasis are identified, including invertebrates, fish, amphibians, reptiles, birds, mammals and plants. Eighty-two natural communities also are described. This work is filled with lists, descriptions and maps. Strangely, authors are not identified either for the entire work, or for parts of it.

EVALUATION OF MACROPHYTE CONTROL IN 41 FLORIDA LAKES USING TRIPLOID GRASS CARP (*CTENOPHARYNGODON IDELLA*) AT DIFFERENT STOCKING RATES, by S.G. Hanlon. Master's Thesis. University of Florida. 1999. 113 pp.

(Order from *Dissertation Abstracts International*, Ann Arbor, Michigan.)

"The use of grass carp can be an effective and economical control for aquatic vegetation such as hydrilla. Early stocking rates (24 to 74 grass carp per hectare of lake area) resulted in grass carp consumption rates that vastly exceeded the growth rates of the aquatic plants and often resulted in the total loss of all submersed vegetation. This study looked at 41 Florida lakes that had been stocked with grass carp for 3 to 10 years with stocking rates ranging from 1 to 60 grass carp per hectare to determine the long term effects of grass carp on macrophyte communities... If the management goal for a lake is to control some of the problem aquatic plants while maintaining a small population of predominately unpalatable aquatic plants, grass carp can be stocked at approximately 8 to 10 fish per hectare."

THE PRODUCTION ECOLOGY OF WETLANDS: THE IBP SYNTHESIS, edited by D.F. Westlake, J. Kvet and A. Szczepanski. 1998. 568 pp.

(Order from Cambridge University Press, 40 West 20 ST, New York, NY 10011-4211. $130 plus S/H.)

In this book, "A wetland is an area dominated by herbaceous macrophytes, which photosynthesize predominantly in the aerial environment and root in a soil which, generally speaking, is entirely saturated with water throughout the greater part of the growing season."

According to the editors, this book differs from other recent books on wetlands in that it "accentuates the roles of biological components and processes in the structure and functioning of wetland ecosystems"; it "concentrates on wetlands of lakes, rivers and fens, which are often relatively alkaline or only slightly acid"; it assesses the ways in which wetland plants interact with microbes and animals through detritus, grazing, and creation of micro-habitats; and the book pays special attention to the structure of wetland plants, mineral cycling, micro-climates and water relations. Book chapters include: General ecology of wetlands; Primary production in wetlands, Further fate of organic matter in wetlands; The role of decomposers in wetlands; The role of animals and animal communities in wetlands; Mineral economy and cycling of minerals in wetlands; Micro-climatic conditions and water economy of wetland vegetation; and The management of wetlands.

BRINGING BACK THE WETLANDS, by B. Streever. 1999. 215 pp.

(Order from Sainty & Associates, POB 1219, Potts Point, NSW Australia 1335. $19.95 plus S/H.)

This is a "novel styled book about the people who work on wetlands, based on the work at Kooragang Island, plus world wide anecdotes." The story is true; names have been changed. It's really a documentary.

THE RIVER VALLEYS OF THE MALTESE ISLANDS --Environment and Human Impact, by S.M. Haslam and J. Borg. 1998. 330 pp.

(To order, contact Dr. S.M. Haslam, Department of Plant Sciences, University of Cambridge, Downing Street, Cambridge CB2 3EA, GREAT BRITAIN)

Only two centuries ago Malta had hundreds of kilometers of active rivers; now most of them are dried up "beds" of brambles and grasses: river valleys and walled river channels with no or very little water. What happened? This book is a "landmark in the appreciation and understanding of the natural and cultural environment" of the Maltese Islands, the island nation in the center of the Mediterranean Sea. The book is filled with maps, pictures and drawings to demonstrate what has happened.

According to the authors, demand from agriculture and population growth; draining marshes for farming and, later, for disease control; and run-off via roads into the sea has diverted and otherwise used up the spring and rain water that used to create Maltese rivers. Unless lessons are learned from these islands, the authors ask if people one day will say, "England has no rivers."

IDENTIFICATION AND BIOLOGY OF NON-NATIVE PLANTS IN FLORIDA'S NATURAL AREAS, edited by K.A. Langeland and K.Craddock Burks. University of Florida. 1999. 165 pp.

(Order from IFAS Publications, POB 110011, Gainesville, FL 32611; 1-800-226-1764. $16.00 plus S/H.)

So far as **APIRS** is aware, this is one of only two identification manuals devoted exclusively to non-native invasive plants. This book treats 62 species, giving synonymy and botanical descriptions as well as sections on distribution and life history, and includes referenced information about each plant's history of introduction and its impact on native ecosystems. Most of the photos are larger-than-usual for similar ID manuals, a welcome improvement.

MEETINGS

9TH ANNUAL SOUTHEASTERN LAKES MANAGEMENT CONFERENCE.
March 22-25, 2000. Columbus, Georgia.

This year's theme: Protecting Lakes and Watersheds: Innovative Solutions to Point and Non-Point Source Pollution. This conference is for the exchange of ideas on restoring, enhancing and preserving watersheds, lakes and reservoirs in the Southeast U.S.

Contact: WWW: http://www.nalms.org

19TH ANNUAL SYMPOSIUM, NORTH AMERICAN LAKE MANAGEMENT SOCIETY.
December 1-4, 1999. Reno, Nevada.

This year's theme: Water: 21st Century Gold. The symposium will "highlight water issues and provide the technical guidance required to intelligently manage our aquatic resources into the future." It will include presentations, commercial exhibits and pre-and post-conference workshops.

Contact: WWW: http://www.nalms.org

PREDICTING PLANT AND ANIMAL OCCURRENCES: ISSUES OF SCALE AND ACCURACY.
October 19-22, 1999. Snowbird, Utah.

This is an international conference to bring together scientists and land managers involved with habitat modeling, with "a focus on the future of modeling to support multi-scale landscape planning efforts for wildlife conservation and management." Abstracts should be submitted by 15 October, 1998. Manuscripts will be peer reviewed and published as a book.

Contact: WWW: http://www.ets.uidaho.edu/coop/1999_symposium.htm ; or contact Mr. Mike Scott (208) 885-6960; Dr. Patricia Heglund (208) 885-2665; or Ms. Kathy Merk (208) 885-2750.

MARKETING & SHIPPING LIVE AQUATIC PRODUCTS '99.
November 14-17, 1999. Seattle, Washington.

"Technological refinements are revitalizing the centuries old practice of providing live aquatic products for display or consumption far from the point of harvest...This conference will assist fishermen, growers and marketers of aquatic products to supply the expanding market while complying with increased restrictions and regulations." Major topics include: resources, shipping, harvesting, physiology, exotics, holding, reconditioning, regulations, packaging, water quality, marketing, research, and environmental, sociological, political and humanitarian considerations.

Contact: Conference Manager, John B. Peters, Nor'Westerly Food Technology Services, 20455 - 1st Ave. NE, Suite C 303, Poulsbo, WA 98370-9329. E-mail: johnbpeters@compuserve.com

27TH ANNUAL MEETING, ECOSYSTEMS RESTORATION AND CREATION.
May 11-12, 2000. Tampa, Florida.

This is a national forum for the exchange of results of scientific research in the restoration, creation and management of freshwater and coastal wetland systems, as well as upland systems. Topics include freshwater and marine wetland systems; uplands systems; marsh, mangrove and seagrass restoration; upland and mixed ecosystem restoration; mitigation, permitting and regulatory policies; mine reclamation; and management techniques.

Contact: F.J. Webb, Hillsborough Community College, Plant City Campus, 1206 N. Park Road, Plant City, FL 33566. (813) 757-2148; E-mail: webb@mail.hcc.cc.fl.us

WETLANDS AND REMEDIATION: AN INTERNATIONAL CONFERENCE.
November 16-17, 1999. Salt Lake City, Utah.

A conference to "bring together wetlands and remediation experts to discuss common issues." Fifty presentations and 60 posters. A proceedings volume will be published. High registration fees.

Contact: WWW: http://www.battelle.org/environment/er/wetconf.html or contact Karl Nehring, Battelle Memorial Institute, E-mail: nehringk@battelle.org; (614) 424-6510.

FROM THE DATABASE

Here is a sampling of the research articles, books and reports which have been entered into the aquatic plant database since January 1999.

The database has more than 49,000 citations. To receive free bibliographies on specific plants and/or subjects, contact APIRS using the information on the back page or use the database online at http://plants.ifas.ufl.edu/

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Odds 'n' Ends

Giant salvinia (*Salvinia molesta*) is invading the United States, and has now been identified in Texas, Louisiana, Florida and Arizona. A biological agent, the beetle, *Cyrtobagous salviniae*, now is being evaluated for use against the dreaded aquatic weed to see if the beetle might be as successful against U.S. infestations as it has been elsewhere. Dr. Philip Tipping (USDA-ARS, Ft. Lauderdale) has begun distributing the beetle at sites in Louisiana and eastern Texas. Besides wanting to know about new infestations of giant salvinia, he also wants to find new sites of *Salvinia minima* where he finds natural populations of the salvinia beetle for collection and distribution. Dr. Tipping can be contacted at (954) 475-0541 X 104, or by E-mail: ptipping@eemail.com

The Weedo Grande River. Unhappy river users in Texas have complained to Texas Governor George W. Bush about the aquatic weed problems that occur on the Rio Grande River near Brownsville. Mr. Benny Berger has sent us pictures of the hydrilla and water hyacinth infestation, saying that citizens are disgusted and that the Border Patrol got their boat stuck in the plants. He states that the plants grow about 6" per day. Mr. Berger can be contacted at 36 River Bend Drive, Brownsville, TX 78520; E-mail: benber@pixelplace.com

The Invasive Woody Plants in the Tropics Research Group, based at the University of Wales (Bangor, UK), has produced a global review of invasions, and has prepared a number of recommendations for management and control Their web site includes papers on invading trees and case histories, as well as recommendations and contacts. http://www.safs.bangor.ac.uk/iwpt

The Hillsborough County (Florida) Lake Atlas is available online. This very well done, logically arranged web site presents an interactive map, a tour of Tampa-area lakes, lake management "volunteer opportunities", and Lakewatch data. Go to it: http://www.lakeatlas.usf.edu

The Estuarine Research Foundation is an "international organization whose purpose is to promote research in estuaries and coastal waters" and "be available as a source of advice in matters concerning estuaries and the coastal zone." Their web site is: http://erf.org/

Other new interesting photo and information features can be found at the Center for Aquatic and Invasive Plant web site. Particulars and photos of more than 150 plant species: http://plants.ifas.ufl.edu/photos.html *plus* Fakahatchee Strand and wild ghost orchid pictures: http://plants.ifas.ufl.edu/fakahat.html *plus* 16 particularly invasive plants: http://plants.ifas.ufl.edu/invasive.html *plus* Pics of 22 north Florida springs: http://plants.ifas.ufl.edu/springs.html

Plant Talk is an interesting quarterly magazine with "news and views on plant conservation worldwide". The beautifully designed and illustrated magazine features articles and editorials about the conservation of plants around the world and includes notices and reviews of books and meetings. The subscription price is US$28 for individuals and US$68 for institutions. Orders from the Americas: Plant Talk, POB 354841, Palm Coast, FL 32135-4841. Orders from the rest of the world: Plant Talk, POB 500, Kingston upon Thames, Surrey, KT2 5XB, United Kingdom. For more information, contact **Plant Talk** at E-mail: plant-talk@dial.pipex.com

Virtually tour the Indian River Lagoon High quality scans of images of the flora of Spain and Portugal are available on CD from Professor Francisco Perez Raya of the University of Granada in Spain. To see examples of the images of more than 1,000 plant taxa, visit their web site: http://www.arrakis.es/~jahita or contact them by E-mail: frperez@platon.ugr.es

You've got to know about FICMNEW. The Federal Interagency Committee for the Management of Noxious and Exotic Weeds is the committee of federal agency employees most interested in noxious, exotic, non-native, non-indigenous (etc.) weeds. View their web site, read the President's Executive Order on Invasive Species, learn about the national invasive species strategy: **http://refuges.fws.gov/FICMNEWFiles/FICMNEWHomePage.html**

More lists, noxious weeds and rare and endangered plants from the Florida Department of Agriculture and Consumer Services (FDACS), along with their associated rules for possession and propagation can be read and downloaded from the FDACS web site: **http://doacs.state.fl.us/~pi/rules.html**

Chaise Hyacinth

Unless you've been on Lake Victoria lately, or here in Florida thirty years ago, it may be difficult to imagine a water hyacinth infestation: floating plants, growing to three feet high, bunched tightly by the wind, upwards of 200 tons of plant mass per acre, covering an *entire* lake or river shore to shore--even large boats can become immobilized. Certainly, fishing and other commerce comes to a halt. On Lake Victoria, more than once water hyacinth has clogged the intake pipes to the power station that supplies Kampala, the capital city of Uganda. No electricity to Kampala. In fact, much of the world's second-largest freshwater lake, which provides fish and accommodates commerce for Tanzania, Kenya and Uganda, is socked in by miles and miles of extra-large "bull" hyacinths.

In the war against water hyacinths, officials have introduced *Neochetina* weevils as biological controls, and have hired a huge grinding machine to break up the gigantic mats. Depending on whom you ask, herbicides may or may not have been employed as well.

Then there's the Water Hyacinth Utilization Project (WHUP), a "sustainable use" project devised to exploit the silver lining of the infestation by using water hyacinths to create jobs. According to Ms. Carolyne Odhiambo, WHUP Coordinator, 60 workers, mostly disadvantaged women, are using the plentiful menace to produce chairs, tables, baskets and shades, paper, books, cards and gift items. WHUP is under the auspices of KICK, a non-governmental organization that aims to develop small enterprises, and is supported by the Department for International Development of Great Britain.

Ms. Odhiambo provided us with photographs of items made from water hyacinth:

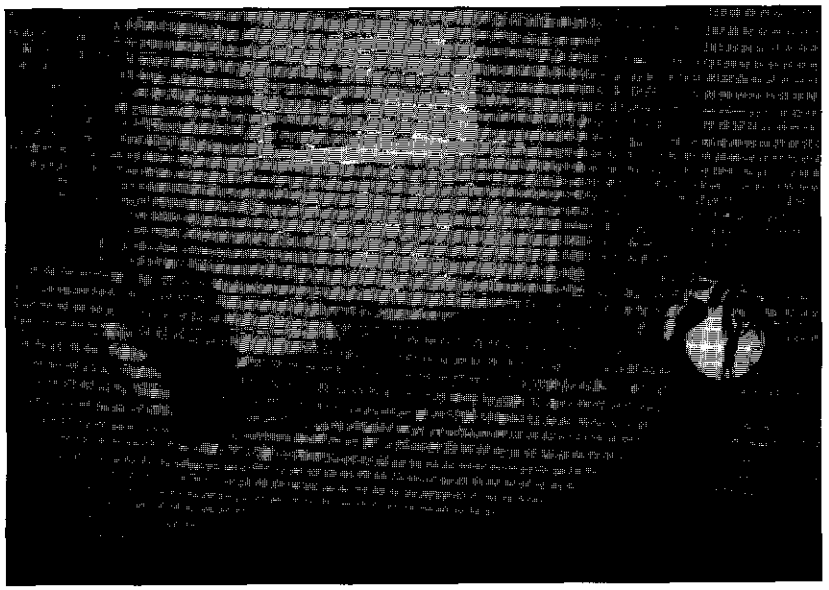
Man making furniture from water hyacinth

For more information, contact WHUP and KICK, POB 284, Kisumu, KENYA. kick@net2000ke.com

See the latest big story on water hyacinth in the *Washington Post*, Wednesday, September 22, 1999, page A25.

For a new book on practical uses of water hyacinth, see **Use Water Hyacinth!** under Books/Reports on page 7.

Water hyacinth (*Eichhornia crassipes*)



Chaise lounge

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AQUAPHYTE

This 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.

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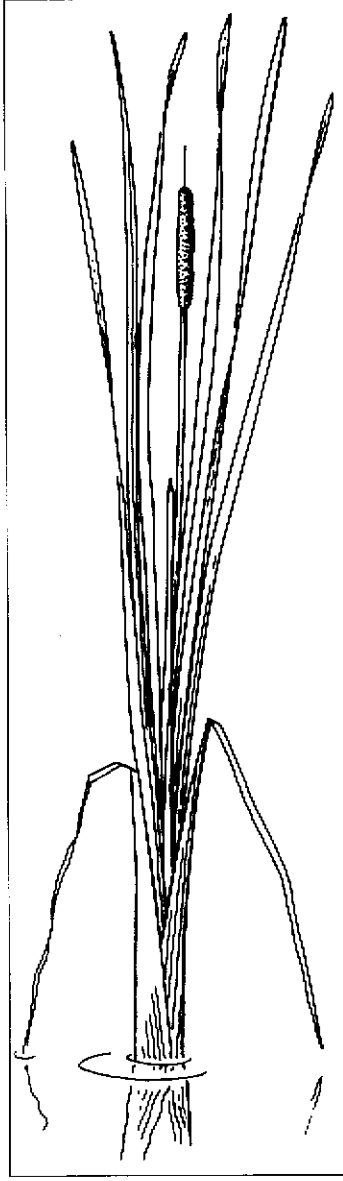
Karen Brown

AQUAPHYTE is sent to managers, researchers and agencies in 71 countries around the world. Comments, announcements, news items and other information relevant to aquatic 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.



Plea for a Plant Introduction

In 1882, an appeal was made for the introduction of *Typha latifolia* to Tasmania for the purpose of constructing buoyant life-saving mattresses for use onboard ships. Such devices were being used on Italian vessels at the time. The Victorian Humane Society of Melbourne tested the mattress and found that it could easily support two persons on the water, so they decided to promote the introdution into the colony of the plant those mattresses were stuffed with. Doubt was expressed on the profitability of this introduction since *Typha angustifolia* already occurred on Tasmania. It was remarked that "attention should be first directed to the species to be found naturally in the island." However, it was argued that "The many lamentable disasters at sea and deplorable shipwrecks, which from time to time cause a thrill of horror like an electric shock to pervade the community, demand the adoption of every possible precaution against such dire calamities; and simple as this remedy appears, it may yet be the means of snatching many a valuable human life from otherwise inevitable destruction. If successful, there can be little doubt that but few vessels would be unprovided with them; and thus a possible means of escape from a watery grave would be afforded in many cases of shipwreck on a coast and within a moderate distance of land."

Who could resist such an impassioned plea?!

from the Papers and Proceedings of the Royal Society of Tasmania for 1882, "Economic Value of the Aquatic Plant *Typha latifolia*," by James Barnard.