

# A Q U A P H Y T E

## Center for Aquatic Plants

With Support From  
The Florida Department of Environmental Protection,  
Bureau of Aquatic Plant Management  
The U.S. Army Corps of Engineers, Waterways Experiment Station,  
Aquatic Plant Control Research Program



UNIVERSITY OF  
FLORIDA

Institute of Food and Agricultural Sciences

Volume 15 Number 2 Fall 1995

Gainesville, Florida

ISSN 0893-7702

<http://aquat1.ifas.ufl.edu/>

The Aquatic Plant Information Retrieval System (APIRS) is now online, available through the Internet as a World Wide Web site. This issue of **AQUAPHYTE** is about how to take advantage of this new dimension of APIRS' free information services.

We invite you to check in as soon as you can. And please let us know via e-mail what you think of what we're doing.

- See pages 4 and 5 for a facsimile and explanation of the APIRS home page.
- See page 2 for a list of Web sites of other "environmental" organizations.

### Thanks to our Sponsors

The APIRS office is most grateful to receive major funding from two other agencies:



The Florida Department of Environmental Protection, Bureau of Aquatic Plant Management, Mr. Tom Brown, Bureau Chief.

The DEP Bureau has provided base support for the aquatic plant database and the APIRS office since its inception more than 16 years ago, and has funded the production of many educational materials including instructional books and videotape programs.

### Aquatic Plant Database Online

The APIRS aquatic plant database is now online, 24-hours a day. The 41,000-item database about freshwater macrophytes is the largest of its kind, and since 1981, it has been used by thousands of regulators, managers, teachers, students, advocacy groups and ordinary taxpayers. Heretofore, users had to write to us or call us and the APIRS office performed their database searches. Now, users may use the database by themselves, searching it in whatever ways they see fit. Use of the database remains free of charge.

To get to the database through the APIRS Web site, simply click on the word "database" in the first line listing on the home page (see page 4 of this issue of **AQUAPHYTE**). This will take you to a page that describes sign-on and sign-off procedures.

After following the sign-on procedure, you may search the database in myriad ways: search by keyword, author, date, citation, plant species, etc.



US Army Corps  
of Engineers

The U.S. Army Corps of Engineers, Waterways Experiment Station, Aquatic Plant Control Research Program (APCRP), Mr. Lewis Decell, Director.

The Corps APCRP has provided special funding for various APIRS enhancements and video productions, and this past summer also funded the complete upgrade of the computers and software that were necessary to place the aquatic plant database online and to establish our aquatic plant Web site on the Internet.

## Some Internet World Wide Web Addresses for Environmental Professionals

The following list was winnowed from hundreds of "environmental" Web sites we have come across and represent the ones that our readers are most likely to want to try.

- AquaNIC - <http://thorplus.lib.purdue.edu/AquaNIC/>
- Aquatic (Wetland) Plants - <http://aquat1.ifas.ufl.edu/>
- Biodiversity and Biological Collections - <http://muse.bio.cornell.edu/>
- Biodiversity, Ecology & the Environment - <http://golgi.harvard.edu/biopages/biodiversity.html>
- Biodiversity & Ecosystems Network - <http://straylight.tamu.edu/bene/bene.html>
- Biological Survey - <http://www.nfrcg.gov>
- CERN Home page - <http://www.cern.ch/>
- Chemistry - <http://www.chem.ucla.edu/chempointers.html>
- Chemistry Home Page - <http://server.chem.ufl.edu/chem.links.html>
- Chironomids - <http://www.uia.ac.be/u/intpanis/index.html>
- Collection of Botany Related URL's - <http://www.helsinki.fi/~rlampine/botany.html>
- Earth Sciences - <http://www.vl-es.geo.ucalgary.ca/VL/html/es-resources.html>
- Ecological Society of America - [http://www.sdsc.edu/1/SDSC/Research/Comp\\_Bio/ESA/ESA.html](http://www.sdsc.edu/1/SDSC/Research/Comp_Bio/ESA/ESA.html)
- Ecology - <http://biomserv.univ-lyon1.fr/Ecology-WWW.html>
- EcoWeb, University of Virginia - <http://ecosys.drdr.virginia.edu:80/EcoWeb.html>
- Energy - <http://solstice.crest.org/online/virtual-library/VLib-energy.html>
- Entomology - <http://www.colostate.edu/Depts/Entomology/WWWVL-Entomology.html>
- EPA - <http://www.epa.gov>
- Environment - <http://ecosys.drdr.virginia.edu/Envirlists.html>
- Environmental Education Network - <http://envirolink.org/enviroed/>
- Environmental Law - <http://www.law.indiana.edu/law/intenvlaw.html>
- Environmental Sites on the Internet - <http://www.lib.kth.se/lg.html>
- Field Museum of Natural History - <http://www.bvis.uic.edu/museum/>
- Fish and other aquatic animals - <http://www.actwin.com/WWWVL-Fish.html>
- Florida Wildflowers - <http://www-wane-leon.scri.fsu.edu/~mikems/>
- Forestry - <http://www.metla.fi/info/vlib/Forestry.html>
- Global Change Master Directory, NASA - <http://gcmd.gsfc.nasa.gov/>
- Great Lakes Program - <http://ncgia.geog.buffalo.edu/GLP/GLPhome.html>
- Illinois Natural History Survey - <http://den1.igis.uiuc.edu:70/>
- Information Center for the Environment - <http://ice.ucdavis.edu:80/>
- Landscape Architecture - <http://www.clr.toronto.edu/VIRTUALLIB/larch.html>
- Man and the Biosphere - [http://ice.ucdavis.edu:80/MAB/MAB\\_main\\_page.html](http://ice.ucdavis.edu:80/MAB/MAB_main_page.html)
- National Biological Service - <http://www.its.nbs.gov/nbs/>
- National Wildlife Refuge System - <http://bluegoose.arw.r9.fws.gov/NWRSFiles/NWRSIndex.html>
- Natural History Book Service - <http://www.nhbs.co.uk>
- Natural Resources Research Info Pages - <http://sfbbox.vt.edu:10021/Y/yfleung/nrrips.html>
- Planet Earth - <http://white.nosc.mil/info.html>
- Plant Biology - <http://golgi.harvard.edu/biopages/botany.html>
- PLANTS Database, Natural Resources Conservation Service - <http://trident.ftc.nrcs.usda.gov/npdc/>
- Remote Sensing and GIS - <http://wwwrsl.forestry.umn.edu:10000/>
- Smithsonian Natural History home page - <http://nmnhwww.si.edu/nmnhweb.html>
- Software, Biological - <http://www.gdb.org/Dan/softsearch/softsearch.html>
- US Fish and Wildlife Reference Database - <http://www.fws.gov/htdocs/fwrefser.html>
- US Geological Survey, Online data - <http://www.usgs.gov/data/index.html>
- US Government Information Sources - [http://iridium.nttc.edu/gov\\_res.html](http://iridium.nttc.edu/gov_res.html)
- US Long-Term Ecological Research Network - <http://internet.edu/>
- Water Lily Society - <http://h20lily.rain.com>
- WaterWeb - <http://www.waterweb.com>
- Whales - <http://www.physics.helsinki.fi/whale/>
- WWW Sites of Interest to Botanists - <http://meena.cc.uregina.ca/~liushus/bio/botany.html>

# A T T H E C E N T E R

## A New Director

**D**r. Randall Stocker is the new director of the UF/IFAS Center for Aquatic Plants. Stocker formerly was Manager of the Planning and Technical Services Department of Imperial Irrigation District (California), the largest irrigation district in the western hemisphere, having use rights to 20% of the flow of the Colorado River. In a place having an average annual rainfall of only 3.5 inches, that water is sometimes contentiously desired by various parties. For fourteen years, Stocker helped manage and share the water among the District's many constituents, learning the finer points of diplomacy and method along the way. As for aquatic plants, his main problems had to do with hydrilla and algae in flowing water canals, ponds and reservoirs, and habitat conservation plans for endangered species.

Coming from a desert having only 3 inches of rain a year to a place of semi-tropical swamps where it rains nearly 60 inches a year is as dramatic a change as any a water manager would likely experience. But Stocker appears unperturbed: he's as "excited to be a participant in the on-going struggle to provide management tools to resource managers" here as he was there. And it's not as though he knows nothing about Florida's ecosystems--he conducted melaleuca control research on Lake Okeechobee for several years when he worked for the U.S. Army Corps of Engineers.

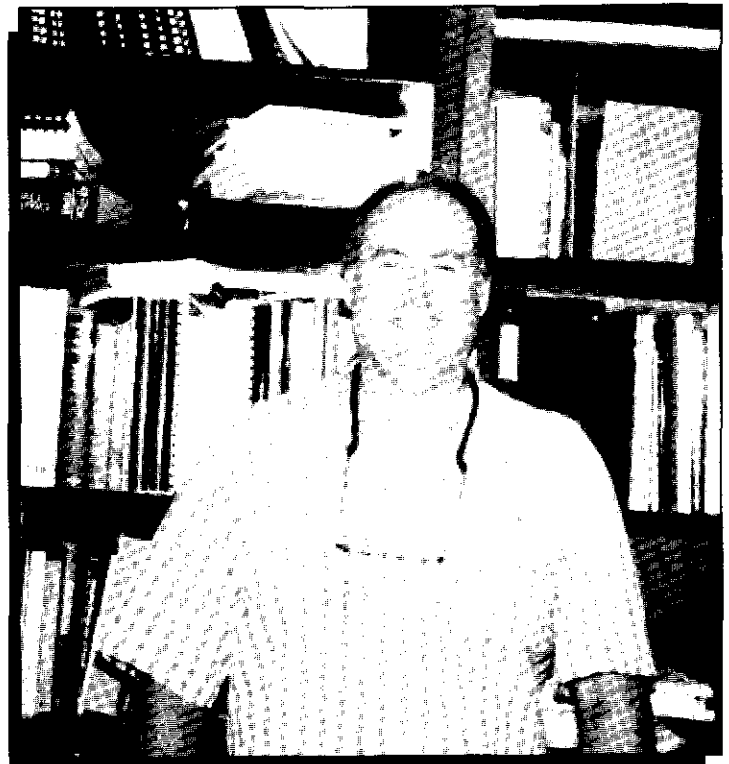
Stocker earned his PhD in plant ecology from Washington State University. Later, while teaching there, he met his future wife, Shelley, a student in an advanced ecology class. Eventually they married, and have two daughters, college-going Heather, and Shevy, a high school senior. Shelley currently is an elementary science and math teacher.

Stocker is an enthusiastic sailor, his 26-foot sloop is scheduled to visit lake and ocean waters throughout the state. He and Shelley say they are pleased to be in a university community again, and are "reawakening" to the joys of theatre and music that are so abundant in Gainesville.

### Aquatic Plant Identification Deck

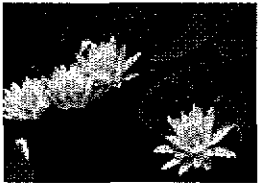
**A** 3" X 4" card deck of color photographs of 67 aquatic and wetland plant species, suitable for in-the-field reference. The cards are alphabetized with two tables of contents, by scientific name and by common name. Each card has plant identification information on the back. The cards are laminated for water resistance and bound with a screw and fastener.

The ID deck (IFAS Catalog No. SM-50) is available from the IFAS Publications Office, IFAS Building 664, University of Florida, Gainesville, FL, 32611-0001, (904) 392-1764. Price is \$8.00 per deck plus S/H and tax. Call for details. Checks or purchase orders are accepted.



**CENTER FOR AQUATIC PLANTS**  
 Institute of Food and Agricultural Sciences  
 University of Florida  
 7922 N.W. 71st Street  
 Gainesville, Florida 32653  
 (904) 392-9613 (After Dec. 1, 1995: (352) 392-9613)

**Dr. Randall Stocker, Director**

	<h1>Center for Aquatic Plants</h1>
University of Florida	Institute of Food and Agricultural Sciences

Welcome to the Center for Aquatic Plants and to APIRS, the Aquatic Plant Information Retrieval System. We provide a variety of free and for-sale products and services.

### Best way to view these pages

- [Online Aquatic Plant Database](#)
- [Photographs of Aquatic Plants](#)
- [Educational Videotape Programs](#)
- [Aquaphyte Newsletter](#)
- [Line drawings of Aquatic Plants](#)
- [Freshwater Plants Poster](#)
- [Aquatic Plant ID Cards](#)
- [Aquatic Plant CD-ROMs](#)
  
- [About Aquatic and Wetland Plants](#)
- [About the Center and Associated Personnel](#)
- [Ask the Aquatic Plant Extension Specialist](#)
- [A Word From Our Sponsors](#)

---

### Links

- [University of Florida](#)
- [UF - Institute of Food and Agricultural Sciences](#)
- [UF - Herbarium](#)
- [Florida Department of Environmental Regulation](#)
- [Environmental Protection Agency](#)
- [Army Corps of Engineers, Waterways Experiment Station](#)
- [Water Lily Society](#)
- [WWW Sites of Interest to Botanists](#)

---

More information is yours for the asking

APIRS, Center for Aquatic Plants  
 7922 N.W. 71st Street  
 Gainesville, FL 32653  
 904-392-1799 v; 904-392-1764 f  
 varamey@nervm.nerdc.ufl.edu

---

Here's where we tell you that our Web site is optimized to be accessed by your **Netscape browser**. However, other browsers such as Mosaic, Internet-in-a-Box and Chameleon also give very good results.

Click here to get to the 41,000+ citations of the **aquatic plant database**. Be sure to read the on-screen instructions *before* beginning your database session.

Before long, this **newsletter** will be online as well. You'll be able to read it on-screen, or download it to paper. This feature is likely to develop into an interactive aquatic plant forum as well.

Here is where you can view and/or download more than 60 **high resolution photographs** of aquatic (wetland) plants which will look pretty good on your 640X480X256 screen (or fantastic on your 800X600X32K screen). If you need photos for print publication, we can help you with that.

**APIRS** has produced about 25 **videotape programs** for various audiences, all having one thing or another to do with aquatic plants. Videos may be purchased or borrowed. Look here for descriptions and ordering information.

An adequate number of you have already expressed interest in purchasing a set of **aquatic plant photograph CDs**, as described in the last issue of **AQUAPHYTE** (Spring, 1995). We're working on them and will let you know.

We would like to re-print the **Freshwater Plants poster** that has been so popular with teachers and libraries. If you want to order a copy, or if you may be interested in paying for its re-printing, click here.

**Line drawings** often are better to look at for identification purposes than are photographs. Here is a collection of 60 aquatic plant line drawings for online viewing. If you need publication-quality drawings for books or newsletters, let us know.

Here is where you can find out **what we look like** and where we get our mail.

Over time, the **APIRS** office will develop this branch of our Web site into a "short course" about aquatic and wetland plants. This section of our Web site will resemble and act like an **interactive instructional CD** about aquatic and wetland plants, but will be better than a CD in that it will be constantly updated and added to.

Here's something new from the **APIRS** office: a **handy deck of ID cards** featuring color photographs of aquatic plants. See page 3 of this newsletter for more information.

Florida's two **aquatic plant Extension Specialists** can be contacted here. They get paid to answer your questions.

The **logos** and links for the U.S. Army Corps of Engineers, the Florida Department of Environmental Protection and the St. John's River Water Management District are here.

**Links** are jumping off points to other sites of interest. Click on their names and you'll go right to them, automatically. Just like in *Star Trek*.

## FROM THE DATABASE

Here is a sampling of the research articles, books and reports which have been entered into the aquatic plant database since March, 1995.

The database has more than 41,000 items. To receive free bibliographies on specific plants and/or subjects, contact APIRS at the address shown on the mail label on page 12.

To obtain articles, contact your nearest state or university library.

### Anderson, M.G.

Interactions between *Lythrum salicaria* and native organisms: a critical review.

ENVIRON. MANAGE. 19(2):225-231, 1995.

### Auble, G.T.; Friedman, J.M.; Scott, M.L.

Relating riparian vegetation to present and future streamflows.

ECOL. APPL. 4(3):544-554, 1994.

### Baillie, P.W.

Renovation of food-processing wastewater by a riparian wetland.

ENVIRON. MANAGE. 19(1):115-126, 1995.

### Barko, J.W.; Chambers, P.A.

Perspectives on submersed macrophyte invasions and declines.

LAKE RESERVOIR MANAGE. 10(1):1-3, 1994.

### Barlocher, F.; Newell S.Y.

Phenolics and proteins affecting palatability of *Spartina* leaves to the gastropod *Littoraria irrorata*.

MARINE ECOL. 15(1):65-75, 1994.

**Barthlott, W.; Riede, K.; Wolter, M.**  
Mimicry and ultrastructural analogy between the semi-aquatic grasshopper *Paulinia acuminata* (Orthoptera: Pauliniidae) and its foodplant, the water-fern *Salvinia auriculata* (Filicatae: Salviniaceae).

AMAZONIANA 13(1-2):47-58, 1994.

### Bird, K.T.; Jewett-Smith, J.;

### Fonseca, M.S.

Use of in vitro propagated *Ruppia maritima* for seagrass meadow restoration.

J. COASTAL RES. 10(3):732-737, 1994.

### Bjork, S.

Treatment of overgrown shallow lakes - Macrophyte control: Lake Hornborga, Sweden.

IN: RESTORATION OF LAKE ECOSYSTEMS - A HOLISTIC APPROACH, M. EISELTOVA, ED., IWRB PUBL. 32 INTERNAT. WATERFOWL WETLANDS RES. BUR., GLOUCESTER, UK, PP.154-168, 1994.

### Blom, C.W.P.M.; Voeselek, L.A.C.J.; Banga, M.; Engelaar, W.M.H.G.; et al

Physiological ecology of riverside species: adaptive response of plants to submergence.

ANNALS BOT. 74(3):253-263, 1994.

### Bornette, G.; Amoros, C.; Castella, C.; Beffy, J.L.

Succession and fluctuation in the aquatic vegetation of two former Rhone River channels.

VEGETATIO 110(2):171-184, 1994.

### Bratoeff, E.A.; Perez-Amador, M.C.

Phytochemical study of *Typha dominicensis* Pers. (Typhaceae).

PHYTON 55:71-75, 1994.

### Bronmark, C.

Effects of tench and perch on interactions in a freshwater, benthic food chain.

ECOLOGY 75(6):1818-1828, 1994.

### Bubier, J.L.; Moore, T.R.

An ecological perspective on methane emissions from northern wetlands.

TRENDS IN ECOL. & EVOLUTION 9(12):460-464, 1994.

### Buckingham, G.R.; Bennett, C.A.

Biological and host range studies with *Bagous affinis*, an Indian weevil that destroys *Hydrilla* tubers.

TECHN. REPT. A-94-8, U.S. ARMY CORPS ENGINEERS, WATERWAYS EXPERIMENT STATION, AQUATIC PLANT CONTROL RES. PROG., VICKSBURG, MS, 54 PP., 1994.

### Catarino, L.M.F.

Ecologia das infestantes aquáticas em canais de rega e utilização da carpa herbívora em protecção integrada.

PH.D. DISSERTATION, UNIVERSIDADE TECNICA DE LISBOA, LISBOA, PORTUGAL, 128 PP., 1995. (IN PORTUGUESE, ENGLISH SUMMARY)

### Catling, P.M.; Spicer, K.W.;

### Biernacki, M.; Lovett Doust, J.

The biology of Canadian weeds. 103. *Vallisneria americana* Michx.

CAN. J. PLANT SCI. 74(4):883-897, 1994.

### Chen, D.X.; Coughenour, M.B.; Eberts, D.; Thullen, J.S.

Interactive effects of CO<sub>2</sub> enrichment and temperature on the growth of dioecious *Hydrilla verticillata*.

ENVIRON. EXPER. BOT. 34(4):345-353, 1994.

### Clark, W.R.

Habitat selection by muskrats in experimental marshes undergoing succession.

CAN. J. ZOOLOG. 72(4):675-680, 1994.

### Clary, W.P.

Vegetation and soil responses to grazing simulation on riparian meadows.

J. RANGE MANAGE. 48(1):18-25, 1995.

### Coates, M.; Ferris, J.

The radiatively driven natural convection beneath a floating plant layer.

LIMNOL. OCEANOGR. 39(5):1186-1194, 1994.

### Colle, D.E.; Shireman, J.V.

Use of grass carp in two Florida Lakes.

IN: PROC. OF THE GRASS CARP SYMP., 7-9 MAR. 1994, CTR. AQUATIC PLANTS, IFAS, UNIV. FL., GAINESVILLE, U.S. ARMY CORPS ENGINEERS, WATERWAYS EXPERIMENT STATION, VICKSBURG, MS, PP.111-120, 1994.

### Conover, M.R.; Kania, G.S.

Impact of interspecific aggression and herbivory by mute swans on native waterfowl and aquatic vegetation in New England.

THE AUK 111(3):744-748, 1994.

### Dads, D.K.; Kumar, S.; Singh, A.K.; Prasad, U.S.

Sucrose mobilisation in maturing seeds of water chestnut (*Trapa bispinosa* Roxb.) and Litchi (*Litchi chinensis* Sonn.).

J. FOOD SCI. TECHNOL. 30(3):199-201, 1993.

### De Jalón, D.G.; Sanchez, P.; Camargo, J.

Downstream effects of a new hydro-power impoundment on macrophyte, macroinvertebrate, and fish communities.

REGULATED RIVERS 9(4):253-261, 1994.

### De Leeuw, J.

Ecology of the salt marshes.

HYDROBIOLOGIA 282/283:299-301, 1994.

### Denny, P.; Bailey, R.; Tukahirwa, E.; Mafabi, P.

Heavy metal contamination of Lake George (Uganda) and its wetlands.

HYDROBIOLOGIA 197(3):229-239, 1995.

**Ding, X.; Jiang, J.; Wang, Y. Wang, W.; Ru, B.**

Bioconcentration of cadmium in water hyacinth in relation to thiol group content.

ENVIRON. POLLUT. 84(1):93-96, 1994.

**Doledec, S.; Statzner, B.**

Theoretical habitat templates, species traits, and species richness: 548 plant and animal species in the upper Rhone River and its floodplain.

FRESHWATER BIOL. 31(3):523-538, 1994.

**Do Prado, A.L.; Heckman, C.W.; Martins, F.R.**

The seasonal succession of biotic communities in wetlands of the tropical wet-and-dry climatic zone: II. The aquatic macrophyte vegetation in the Pantanal of Mato Grosso, Brazil.

INT. REVUE GES HYDROBIOL. 79(4):569-589, 1994.

**Duarte, C.M.; Planas, D.; Penuelas, J.**

Macrophytes, taking control of an ancestral home.

IN: LIMNOLOGY NOW: A PARADIGM OF PLANETARY PROBLEMS, R. MARGALEF, ED., ELSEVIER SCI. B.V., PP.59-79, 1994.

**Dushenko, W.T.; Bright, D.A.; Reimer, K.J.**

Arsenic bioaccumulation and toxicity in aquatic macrophytes exposed to gold-mine effluent: relationships with environmental partitioning, metal uptake and nutrients.

AQUATIC BOT. 50(2):141-158, 1995.

**Eckert, C.G.; Barnett, S.C.H.**

Inbreeding depression in partially self-fertilizing *Decodon verticillatus* (Lythraceae): population-genetic and experimental analyses.

EVOLUTION 48(4):953-964, 1994.

**Edwards, E.S.; Roux, S.J.**

Limited period graviresponsiveness in germinating spores of *Ceratopteris richardii*.

PLANTA 195(1):150-152, 1994.

**Fairchild, J.F.; LaPoint, T.W.; Schwartz, T.R.**

Effects of an herbicide and insecticide mixture in aquatic mesocosms.

ARCH. ENVIRON. CONTAM. TOXICOL. 27(4):527-533, 1994.

**Furness, C.A.**

The pollen morphology of *Hygrophila* and *Brillantaisia* (Acanthaceae: Ruelieae).

ACTA BOT. GALLICA 141(2):267-278, 1994.

**Gaudet, C.L.; Keddy, P.A.**

Competitive performance and species distribution in shoreline plant communities: a comparative approach.

ECOLOGY 76(1):280-291, 1995.

**Gerber, D.T.; Les, D.H.**

Comparison of leaf morphology among submersed species of *Myriophyllum* (Haloragaceae) from different habitats and geographical distributions.

Am. J. Bot. 81(8):973-979, 1994.

**Godfrey, K.E.; Anderson, L.W.J.**

Feeding by *Bagous affinis* (coleoptera: Curculionidae) inhibits germination of *Hydrilla* tubers.

FL. ENTOMOL. 77(4):480-488, 1994.

**Greenway, M.**

Litter accession and accumulation in a *Melaleuca quiquenervia* (Cav.) S.T. Blake wetland in Southeastern Queensland.

AUST. J. MAR. FRESHWATER RES. 45(8):1509-1519, 1994.

**Habeck, D.H.; Thompson, C.R.**

Host specificity and biology of *Spodoptera pectinicornis* (Lepidoptera: Noctuidae), a biological control agent of waterlettuce (*Pistia stratiotes*).

BIOL. CONTROL 4(3):263-268, 1994.

**Hamana, K.; Matsuzaki, S.; Niitsu, M.; Samejima, K.**

Distribution of unusual polyamines in aquatic plants and gramineous seeds.

CAN. J. BOT. 72(8):1114-1120, 1994.

**Henry, C.J.; Higgins, K.F.; Buhl, K.J.**

Acute toxicity and hazard assessment of rodeo, X-77 spreader, and Chem-trol to aquatic invertebrates.

ARCH. ENVIRON. CONTAM. TOXICOL. 27(3):392-399, 1994.

**Hinch, S.G.; Collins, N.C.**

Relationships of littoral fish abundance to water chemistry and macrophyte variables in central Ontario lakes.

CAN. J. FISH. AQUAT. SCI. 50(9):1870-1878, 1993.

**Jackson, L.J.; Rowan, D.J.; Cornett, R.J.; Kalf, J.**

*Myriophyllum spicatum* pumps essential and nonessential trace elements from sediments to epiphytes.

CAN. J. FISH. AQUAT. SCI. 51(8):1769-1773, 1994.

**Jacobs, S.W.L.; Perrett, F.; Sainty, G.R.; Bowmer, K.H.; Jacobs, B.J.**

*Ludwigia peruviana* (Onagraceae) in the botany wetlands near Sydney, Australia.

AUST. J. MAR. FRESHWATER RES. 45(8):1481-1490, 1994.

**Jorde, D.G.; Haramis, G.M.; Bunck, C.M.; Pendleton, G.W.**

Effects of diet on rate of body mass gain by wintering canvasbacks.

J. WILDL. MANAGE. 59(1):31-39, 1995.

**Khan, H.; Brush, G.S.**

Nutrient and metal accumulation in a freshwater tidal marsh.

ESTUARIES 17(2):345-360, 1994.

**Kohlmeyer, J.; Volkman-Kohlmeyer, B.**

Fungi on *Juncus roemerianus*. 1. *Trichocladium medullare* sp. Nov.

MYCOTAXON 53:349-353, 1995.

**Krabel, D.; Eschrich, W.; Gamalei, Y.V.; Fromm, J.; Ziegler, H.**

Acquisition of carbon in *Elodea canadensis* Michx.

J. PLANT PHYSIOL. 145(1-2):50-56, 1995.

**Kraus, W.; King, J.J.**

The ecological status of Lough Corrib, Ireland, as indicated by physiographic factors, water chemistry, and macrophytic flora.

VEGETATIO 110(2):149-161, 1994.

**Linder, G.; Hazelwood, R.;**

**Palawski, D.; Bollman, M.; et al** Ecological assessment for the wetlands at Milltown Reservoir, Missoula, Montana: characterization of emergent and upland habitats.

ENVIRON. TOXICOL. CHEM. 13(12):1957-1980, 1994.

**Linz, G.; Bergman, D.; Blixt, D.; Bleier, W.**

Response of black terns (*Chlidonius niger*) to glyphosate-induced habitat alterations on wetlands.

COLONIAL WATERBIRDS 17(2):160-167, 1994.

**Lovett Doust, L.; Lovett Doust J.; Biernacki, M.**

American wildcelery, *Vallisneria spiralis*, as a biomonitor of organic contaminants in aquatic ecosystems.

J. GREAT LAKES RES. 20(2):333-354, 1994.

**Madsen, T.V.; Sand-Jensen, K.**

The interactive effects of light and inorganic carbon on aquatic plant growth.

PLANT CELL ENVIRON. 17(8):955-962, 1994.

**Mallison, C.T.; Hestand, R.S.; Thompson, B.Z.**

Removal of triploid grass carp using fish management bait (FMB).

IN: PROC. OF THE GRASS CARP SYMP., 7-9 MAR. 1994, CTR. AQUATIC PLANTS, IFAS, UNIV. FL., GAINESVILLE, U.S. ARMY CORPS ENGINEERS, WATERWAYS EXPERIMENT STATION, VICKSBURG, MS, PP. 65-71, 1994.

**Marks, M.; Lapin, B.; Randall, J.**  
*Phragmites australis* (*P. communis*): threats, management, and monitoring.

NATURAL AREAS J. 14(4):285-294, 1994.

**Merchant, M.**

The potential for control of the soft rush (*Juncus effusus*) in the grass pasture by grazing goats.

GRASS FORAGE SCI. 48(4):395-409.

**Mikryakova, T.F.**

Distribution of heavy metals in higher aquatic plants of the Uglich Reservoir.

RUSSIAN J. ECOL. 25(1):12-16, 1994.

**Milles, H.D.; Tunswan, K.; Chittawong, V.**

Boil weevil antifeedants from *Eleocharis dulcis* Trin.

J. AGRIC. FOOD CHEM. 42(7):1561-1562, 1994.

**Mullahey, J.J.; Cornell, J.**

Biology of tropical soda apple (*Solanum viarum*) an introduced weed in Florida.

WEED TECHNOL. 8(3):465-469, 1994.

**Murphy, K.J.; Hudson, K.D.; Mitchell, J.**

Freshwater and wetland plant communities of Loch Lomond.

HYDROBIOLOGIA 290(1-3):63-74, 1994.

**Neskovic, N.; Karan, V.; Elezovic, L.; Poleksic, V.; Budinir, M.**

Toxic effects of 2,4-D herbicide on fish.

J. ENVIRON. SCI. HEALTH B29(2):265-279, 1994.

**Ni, L.; Pokorny, J.**

Effects of cutting on the growth and photosynthesis of *Egeria densa* (Planchon) Caspary.

BIENNIAL REPT. OF FRESHWATER ECOLOGY AND BIOTECHNOLOGY LAB. (FEBL), BEIJING, CHINA, PP. 41-48, 1994.

**Nip, W.K.; Whitaker, C.S.; Vargo, D.**

Application of taro flour in cookie formulations.

INTERNAT. J. FOOD SCI. TECHNOL. 29(4):463-468, 1994.

**Oron, G.**

Duckweed culture for wastewater renovation and biomass production.

AGRIC. WATER MANAGE. 26(1-2):27-40, 1994.

**Ou, Z.; Sun, T.; Zhang, H.**

A bioassay for determining simazine in water using flowering plants (*Ceratophyllum oryzetorum*, *Ranunculus trichophyllus*, and *Alisma plantago-aquatica*).

PESTIC. SCI. 42(3):173-178, 1994.

**Pandey, D.K.**

Inhibition of *Salvinia* (*Salvinia molesta* Mitchell) by *Parthenium* (*Parthenium hysterophorus* L.). I. Effect of leaf residue and allelochemicals.

J. CHEM. ECOL. 20(12):3111-3122, 1994.

**Paul, E.A.; Simonin, H.A.; Symula, J.; Bauer, R.W.**

The toxicity of diquat, endothal, and fluridone to the early life stages of fish.

J. FRESHWATER ECOL. 9(3):229-239, 1994.

**Petrell, R.J.; Smerage, G.H.; Bagnall, L.O.**

Mathematical description of water hyacinth (*Eichhornia crassipes*) mat compaction.

TRANS. ASAE 37(5):1623-1629, 1994.

**Popolizio, C.A.; Goetz, H.; Chapman, P.L.**

Short-term response of riparian vegetation to 4 grazing treatments.

J. RANGE MANAGE. 47(1):48-53.

**Portielje, R.; Roijackers, R.M.M.**

Primary succession of aquatic macrophytes in experimental ditches in relation to nutrient input.

AQUATIC BOT. 50(2):127-140, 1995.

**Purcell, M.F.; Balciunas, J.K.**

Life history and distribution of the Australian weevil *Oxyops vitiosa* (Coleoptera: Curculionidae), a potential biological control agent for *Melaleuca quinquenervia* (Myrtaceae).

ANN. ENTOMOL. SOC. AM. 87(6):867-873, 1994.

**Quiroz, A.; Miranda, G.**

Heavy metals and macronutrients concentration on leaves and petioles of *Nymphaea mexicana* Zucc. in a polluted pond of Xochimilco, Mexico.

PHYTON 55:83-87, 1994.

**Rascio, N.; Mariani, P.; Dalla Vecchia, F.; et al**

Ultrastructural and photosynthetic structures of leaves and stems of *Elodea canadensis*.

J. PLANT PHYSIOL. 144(3):314-323, 1994.

**Ribeyre, F.; Boudou, A.**

Experimental study of inorganic and methylmercury bioaccumulation by four species of freshwater rooted macrophytes from water and sediment contamination sources.

ECOTOXICOL. ENVIRON. SAFETY 28(3):270-286, 1994.

**Rider, S.J.; Maccina, M.J.; Lowery, D.R.**

Comparisons of cove rotenone and electrofishing catch-depletion estimates to determine abundance of age-0 large-mouth bass in unvegetated and vegetated areas.

J. FRESHWATER ECOL. 9(1):19-27, 1994.

**Sharp, W.M.**

Propagation of *Potamogeton* and *Sagittaria* from seeds.

TRANS. N. AM. WILDL. CONF. 4:351-358, 1939.

**Simonich, M.T.; Morgan, M.D.**

Allozymic uniformity in *Iris lacustris* (Dwarf Lake Iris) in Wisconsin.

CAN. J. BOT. 72(11):1720-1722, 1994.

**Srivastav, R.K.; Gupta, S.K.; Nigam, K.P.D.; Vasudevan, P.**

Treatment of chromium and nickel in wastewater by using aquatic plants.

WATER RES. 28(7):1631-1638, 1994.

**Steinberg, S.L.; Coonrod, H.S.**

Oxidation of the root zone by aquatic plants growing in gravel-nutrient solution culture.

J. ENVIRON. QUAL. 23(5):907-913, 1994.

**Summers, J.E.; Jackson, M.B.**

Anaerobic conditions strongly promote extension by stems of overwintering tubers of *Potamogeton pectinatus*.

J. EXPER. BOT. 45(278):1309-1318, 1994.

**Takamiya, M.; Watanabe, M.; Ono, K.**

Biosystematic studies on the genus *Isoetes* in Japan variations of the somatic chromosomes numbers.

J. PLANT RES. 197:289-297, 1994.

**Tanner, C.C.; Clayton, J.S.; Upsdell, M.P.**

Effect of loading rate and planning on treatment of dairy farm wastewaters in constructed wetlands - I. Removal of oxygen demand, suspended solids and faecal coliforms.

WAT. RES. 29(1):17-26, 1995.

**Teller, S.; Appenroth, K.J.**

The appearance of glutamine synthetase in turions of *Spirodela polyrhiza* (L.)



Schleiden as regulated by blue and red light, nitrate, and ammonium.

J. EXPER. BOT. 45(278):1219-1226, 1994.

Uheda, E.; Kitoch, S.; Dohmaru, T.; Shiomi, N.

Isolation and analysis of gas bubbles in the cavities of *Azolla* leaves.

PHYSIOL. PLANT. 93(1):1-4, 1995.

Valdovinos-Ponce, G.; Ponce-Salazar, R.M.; Marquez-Guzman, J.

Histoquímica del desarrollo de la testa de *Ipomoea aquatica* Forsk (Convolvulaceae) en relación con la permeabilidad al agua.

PHYTON 55:107-114 (IN SPANISH), 1994.

Van, T.K.; Center, T.D.

Effect of paclobutrazol and water hyacinth weevil (*Neochetina eichhorniae*) on plant growth and leaf dynamics of water hyacinth (*Eichhornia crassipes*).

WEED SCI. 42(4):665-672, 1994.

Van Thielen, R.V.; Ajuonu, O.; Schade, V.; Neuenschwander, P.; et al

Importation, releases, and establishment of *Neochetina* spp. (Col.: Curculionidae) for the biological control of water hyacinth, *Eichhornia crassipes* (Lil.: Pontederiaceae), in Benin, West Africa.

ENTOMOPHAGA 39(2):179-188, 1994.

Vaughan, D.; Cheshire, M.V.; Ord, B.G.

A simple technique for producing <sup>13</sup>C or <sup>14</sup>C-labeled fronds of *Lemna gibba* and their use in soil incubation investigations.

PLANT SOIL 160(2):185-191, 1994.

Villar, D.; Knight, M.J.; Hansen, S.R.; Buck, W.B.

Toxicity of *Melaleuca* oil and related essential oils applied topically on dogs and cats.

VET. HUMAN TOXICOL. 36(2):139-142, 1994.

Voge, M.

Tauchbeobachtungen in seidlungsge-wässern von *Elodea nuttallii* (Planch.) St. John.

TUEXENIA 14:335-342, (IN GERMAN; ENGLISH SUMMARY), 1994.

Wang, H.L.; Zhang, C.L.; Liang, H.G.

Seasonal changes of polyamines in habitat adaptation of different ecotypes of reed plants.

OECOLOGIA 10(1):119-123, 1995.

White, D.S.; Howes, B.L.

Translocation, remineralization, and turnover of nitrogen in the roots and rhizomes of *Spartina alterniflora* (Gramineae).

AM. J. BOT. 81(10):1225-1234, 1994.

## Computer Software From the U.S. Army Corps of Engineers

### Herbivores of Exotic Aquatic Plants

by M.J. Grodowitz, W.A. Johnson, T.D. Center, G. Buckingham, and A.F. Cofrancesco, Jr.; with photographs by W. Durden

For IBM 386 or better, running Windows 3.1, hard drive with 19 MB free space, video mode 640X480X256 color, install from 13 IBM 1.44 MB discs

Since 1959, twelve insect agents for the biological control of the exotic aquatic plants, alligatorweed, water hyacinth, water lettuce and hydrilla, have been investigated and released, and are now established in eleven US states. Many native insects are also at work feeding upon and damaging these problem plants. As biocontrol experts note, "With the increasing diversity of insect biocontrol agents, identification, recognition and the use of these agents becomes increasingly complicated."

Aquatic plant managers need to be able to identify feeding insects so they can understand and document how much biocontrol is being exerted, and so they can make aquatic plant management plans accordingly. This software is specifically for aquatic plant managers, and makes it possible for non-experts to identify any of 28 insects (fourteen native insects and fourteen exotic insects are treated) that may be feeding on the four major exotic weeds of special concern.

*Herbivores of Exotic Aquatic Plants* is actually two computer programs: *ID Expert-Insect* and *ID Expert-Damage*. One enables the user to identify the feeding insect they see before them; the other enables the user to identify the insect according to the feeding damage that is evident on the plants. Both program parts are easily mastered—the more matching characteristics the user is able to choose from the program's characteristics list, the more likely the list of possible insects is reduced from 28 down to the one in question.

From the list of possible insects, the user may choose to see photographs of larval and adult stages, or may choose to read about an insect's history, plant hosts, scientific description, collection techniques, feeding damage and effects on plants. For example, according to the program the feeding damage of *Amynothrips andersoni*, the alligatorweed thrips, resembles damage caused by the herbicide 2,4-D (brown curling leaves, highly folded).

Installation of the program is simple: insert disc 1, "Run" from "File" in Windows 3.1, and wait to be prompted for each of the 13 installation discs. When loaded (about 20 minutes), a new "program window" appears having icons for each of the two program parts "Insect" and "Damage". The program design and layout is very professional looking and colorful. However, some of the photographs as presented on a 640X480X256 screen leave something to be desired. For example the pictures of the mites look like tiny black discs and the picture of the adult thrips looks like an insect's shadow. Perhaps the photos should be made larger, and the required video mode should be higher so that images would have higher resolutions and the insects and their parts would be more identifiable.

For ordering information, contact Ms. Christine M. Bauer, US Army Corps of Engineers, Jacksonville District, POB 4970, Jacksonville, FL 32232-0019, 904/232-2074.

## Books/Reports

**AN ASSESSMENT OF INVASIVE NON-INDIGENOUS SPECIES IN FLORIDA'S PUBLIC LANDS**, edited by D.C. Schmitz and T.C. Brown. 1994. 303 pp.

(Order from Bureau of Aquatic Plant Management, Florida Department of Environmental Protection, 2051 East Dirac Drive, Tallahassee, FL 32310, 904/488-5631. Technical Report TSS-94-100.)

This report consists of chapters and essays by some 60 authors. They discuss the ecological consequences and histories of non-native introductions; impacts of non-indigenous species on public lands and their economic costs; biocontrol and restoration; governmental approaches; and conservation priorities.

They describe a number of exotic species in Florida, from the "Australian pine" to hydrilla to the aggressive brown tree snake (from the Solomon Islands), which "could devastate Florida's environment and tourism industry."

The editors state that "non-indigenous species invasions now threaten Florida's environment at all levels."

**THE IMPORTANCE OF AQUATIC-TERRESTRIAL ECOTONES FOR FRESHWATER FISH**, edited by F. Schiemer, M. Zalewski and J.E. Thorpe. 1995. 264 pp.

(Order from Kluwer Academic Publishers Group, 101 Philip Drive, Norwell, MA 02061. US\$211.00.)

"Ecotones are interface zones between different ecosystems." According to the editors, ecotones perform important functions, they may be almost any size and shape, and may themselves be comprised of smaller ecotones. They may exist for only days or for decades, and they may evolve into new ecotones. *Why aren't ecotones considered ecosystems? Are attempts to define ecotones mere sophism? Maybe not.*

This collection of 25 papers describes the roles of ecotones in lakes and reservoirs, in streams, large rivers, and floodplains, especially as ecotones serve fish populations as feeding, spawning and nursery areas.

**PLANTAS ACUATICAS VASCULARES DE VENEZUELA**, by J. Velasquez. 1994. 992 pp. (In Spanish.)

(Order from J. Velasquez, Consejo de Desarrollo Científico y Humanístico, Universidad Central de Venezuela.)

This very thorough book is by Profesor Justiniano Velasquez ("hombre modesto" according to the prolog), a botany professor at the Universidad Central de Venezuela.

It is a keyed taxonomy of several hundred aquatic plants of Venezuela, with distribution maps of occurrences in that country. Most of the plants are illustrated by very good line drawings, and 90 are illustrated by color photographs as well. In addition, the fruits of some plants are represented by b/w photographs. The quality of the printing is not very good, but is adequate.

**PLANTAS INFESTANTES E NOCIVAS-TOMO III, PLANTAS DICOTILEDONEAS POR ORDEM ALFABETICA DE FAMILIAS: GERANIACEAE A VERBENACEAE**, by K.G. Kissmann and D. Groth. 1995. 683 pp. (In Portuguese.)

(For ordering information, contact Dr. Kurt Kissmann, Rua Joao Moura 434, 05412-001 Sao Paulo, BRAZIL.)

"This is the final volume of a work covering the weeds and grasses of South America, focusing on Brazil. It is intended as a practical guide for agronomists rather than academic botanists."

This hardbound handbook treats terrestrial and aquatic weeds. Each problem plant is described and pictured by a color photograph, and the synonymy, taxonomy, distribution, economic importance, biology and morphology (including fruits) are presented. There are indices for scientific and for common names.

The photographs are excellent and the quality of the publication in general is exceptional.

**FLORA Y VEGETACION DE LAS LAGUNAS Y HUMEDALES DE LA PROVENCIA DE CUENCA**, by S. Cirujano. 1995. 224 pp. (In Spanish.)

(For ordering information, contact Dr. Santos Cirujano Bracamonte, Consejo Superior de Investigaciones Científicas, Real Jardín Botánico, Plaza de Murillo, 2-28014 Madrid, SPAIN, (91) 420 30 17. Ext.208.)

This hardbound book represents a systematic study of the aquatic plants of the "lagoons" and wetlands of Cuenca Province, Spain. During a three-year

study, one hundred ninety-six sites were inventoried: 61 taxa of hydrophytes as well as 57 taxa of hygrophilous plants and helophytes were identified. Phytosociological classes also were identified, including 27 plant communities.

**FENS AND BOGS IN THE NETHERLANDS: VEGETATION, HISTORY, NUTRIENT DYNAMICS AND CONSERVATION**, edited by J.T.A. Verhoeven. 1992. 490 pp.

(Order from Kluwer Academic Publishers Group, P.O. Box 989, 3300 AZ Dordrecht, THE NETHERLANDS. US\$239.00.)

This book includes ten chapters about peatland ecosystems by a dozen Dutch scientists. They present detailed pictures of the geology, land use, history, palaeoecology, ecology and conservation of peatlands in The Netherlands.

**OUR LIVING RESOURCES: A REPORT TO THE NATION ON THE DISTRIBUTION, ABUNDANCE, AND HEALTH OF U.S. PLANTS, ANIMALS AND ECOSYSTEMS**, edited by E.T. LaRoe, G.S. Farris, C.E. Puckett, P.D. Doran and M.J. Mac. 1995. 530 pp.

(Order from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, Stock #024-010-00708-7. \$44.00)

In this beautifully produced book, nearly 200 articles are collected and edited by the National Biological Service (US Department of the Interior), which hopes to "stimulate new work on the status and trends of biological resources."

"The report compiles, for scientists, managers, and the lay public, information on many species and the ecosystems on which they depend...it brings together for the first time a host of information about our nation's biological wealth, highlighting causes for both comfort and concern."

It includes sections on the distribution, abundance and health of birds, mammals, reptiles and amphibians, fishes, invertebrates and plants, as well as terrestrial and aquatic ecosystems and ecoregions; and contains many discussions on "special issues" such as global climate change, human influences, non-native species and habitat assessments.

## Meetings

### **VTH INTECOL INTERNATIONAL WETLANDS CONFERENCE. September 22-18, 1996. Perth, Australia. University of Western Australia.**

Co-sponsored by the Society of Wetland Scientists, *Wetlands for the Future* is the theme for the 1996 conference. The conference will emphasize our understanding of wetlands now, the importance of conservation and management, and the role of technology in maintaining wetlands in the future.

For more information, contact J. Davis, School of Biological and Environmental Sciences, Murdoch University, Murdoch, Western Australia 6150. Phone 61 9 360 2939; e-mail: davis@essun1.murdoch.edu.au

### **23RD ANNUAL CONFERENCE ON ECOSYSTEMS RESTORATION AND CREATION. May 16-17, 1996. Tampa, Florida.**

Sponsored by the Hillsborough Community College Institute of Florida Studies, this annual conference provides a forum for the nationwide exchange of results of scientific research in the restoration, creation and management of wetlands and upland systems.

For more information, contact F.J. Webb, Dean of Environmental Programs, Hillsborough Community College, Plant City Campus, 1206 N. Park Road, Plant City, FL 33566, 813/757-2104.

### **IXTH INTERNATIONAL SYMPOSIUM ON BIOLOGICAL CONTROL OF WEEDS. January 21-26, 1996. Stellenbosch, South Africa.**

As in the previous symposia, all aspects of the theory and practice of biological weed control will be covered.

For more information, contact J.H. Hoffmann, Zoology Department, University of Cape Town, Rondebosch 7700, South Africa.

### **SYMPOSIUM ON NON-NATIVE ORGANISMS IN WESTERN AQUATIC ECOSYSTEMS, AND THE ANNUAL MEETING OF THE WESTERN AQUATIC PLANT MANAGEMENT SOCIETY. March 27-29, 1996. Portland, Oregon.**

The Symposium will feature speakers who will discuss a number of non-indigenous aquatic pest species, including fish, plants and insects. The WAPMS will meet concurrently with western chapters of the North American Lake Management Society (NALMS). WAPMS issues will include aquatic plant biology, ecology and management. The NALMS chapter meetings will be for lay people and will feature lake management issues.

For more information, contact M. Sytsma, Biology Department, Portland State University, POB 751, Portland, OR 97207; 503/725-3833; e-mail: h2ms@odin.cc.pdx.edu

### **FLORIDA LAKE MANAGEMENT SOCIETY ANNUAL CONFERENCE. May 22-24, 1996. Ocala, Florida.**

The theme of this seventh annual conference is, *Decision Making in Lake Management*.

For information, contact M. Hoyer, U.F. Department of Fisheries and Aquaculture, 7922 NW 71 ST, Gainesville, FL 32653; 904/392-9617 X 227.

### **IVTH SYMPOSIUM ON BIOGEOCHEMISTRY OF WETLANDS. March 4-6, 1996. New Orleans, Louisiana.**

Sponsored by the Louisiana State University Wetland Biogeochemistry Institute and co-sponsored by the University of Florida, the meeting will emphasize biogeochemical processes occurring in freshwater, estuarine and saline wetlands.

For more information, contact K. Gros, Wetland Biogeochemistry Institute, Louisiana State University, Baton Rouge, LA 70803-7511; 504/388-8810; e-mail: cowgro@lsuvm.sncc.lsu.edu

### **DOMESTICATION, PRODUCTION AND UTILIZATION OF NEW CROPS: PRACTICAL APPROACHES. July 8-10, 1996. University of Southampton, United Kingdom.**

Sponsored by the International Centre for Underutilised Crops (ICUC), this three day conference will feature discussions of sources of new crops, mechanics of crop development and utilisation and marketing.

For more information, contact N. Haq, Conference Secretariat, International Centre for Underutilised Crops, Building 62, University of Southampton, Southampton S016 7PX, United Kingdom.

Institute of Food and Agricultural Sciences  
**AQUATIC PLANT INFORMATION  
RETRIEVAL SYSTEM (APIRS)**  
Center for Aquatic Plants  
University of Florida  
7922 N.W. 71st Street  
Gainesville, Florida 32653 USA  
(352) 392-1799

NONPROFIT ORG.  
ZIP+4 BARCODED  
U.S. POSTAGE PAID  
GAINESVILLE, FL  
PERMIT NO. 540

Address Correction Requested

## AQUAPHYTE

This is the newsletter of the Center for Aquatic Plants and the Aquatic 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**

vramey@nervm.nerdc.ufl.edu

*AQUAPHYTE* is sent to more than 5,500 managers, researchers and agencies in 87 countries. 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.

## Careers in Florida's Freshwater Environments

### A New Environmental Education Video for Kids

When you ask middle school students in Florida what they want to be when they grow up, the answers are, "I want to be a professional football player", and "I want to be a nurse". Though we will always need medical workers, and football players are extremely important to us all, there are and will be openings in other

occupations, such as those that protect and manage our aquatic environments. For various reasons, school children do not know this.

Here is a fast-paced 26-minute musical video, which introduces about 40 "freshwater occupations". It was produced especially for and has been field-tested on 7th and 8th grade students (though students in other grades also will benefit from it). Middle school science teachers helped produce this program.

It was partially funded by the Florida Advisory Council on Environmental Education, (FACEE) which in turn is funded by the sales of the *Save the Manatee* and *Panther* state license tags.

The *Careers* video (VT1236) and booklet will be distributed free to Florida science teachers and career counselors. For all others, the cost is \$15, plus S/H. Call the APIRS office for free copies; to purchase, call IFAS Publications, (352) 392-1764.

### Environmental Education

## Careers in Florida's Freshwater Environments

Produced especially for and tested on 7th and 8th grade students. Other students, grades 4 - 10, also will learn something from this program.

This fast-paced, musical video introduces students to the many occupations needed to protect and preserve our lakes, rivers, and wetlands.

This video was designed to be used during one class period. If, at the bell, the teacher quickly introduces the video and then shows it, there will be time for about 15 minutes of focused discussion about freshwater environmental careers.

Be sure to refer to the accompanying booklet of the same title which gives more details about the occupations depicted.

### Viewing Notes To Teachers

- 1 Close the curtains
- 2 Turn off the lights
- 3 Play it loud!

December 1985  
VHS - Length: 26 minutes  
FAS Videotape #VT - 1236