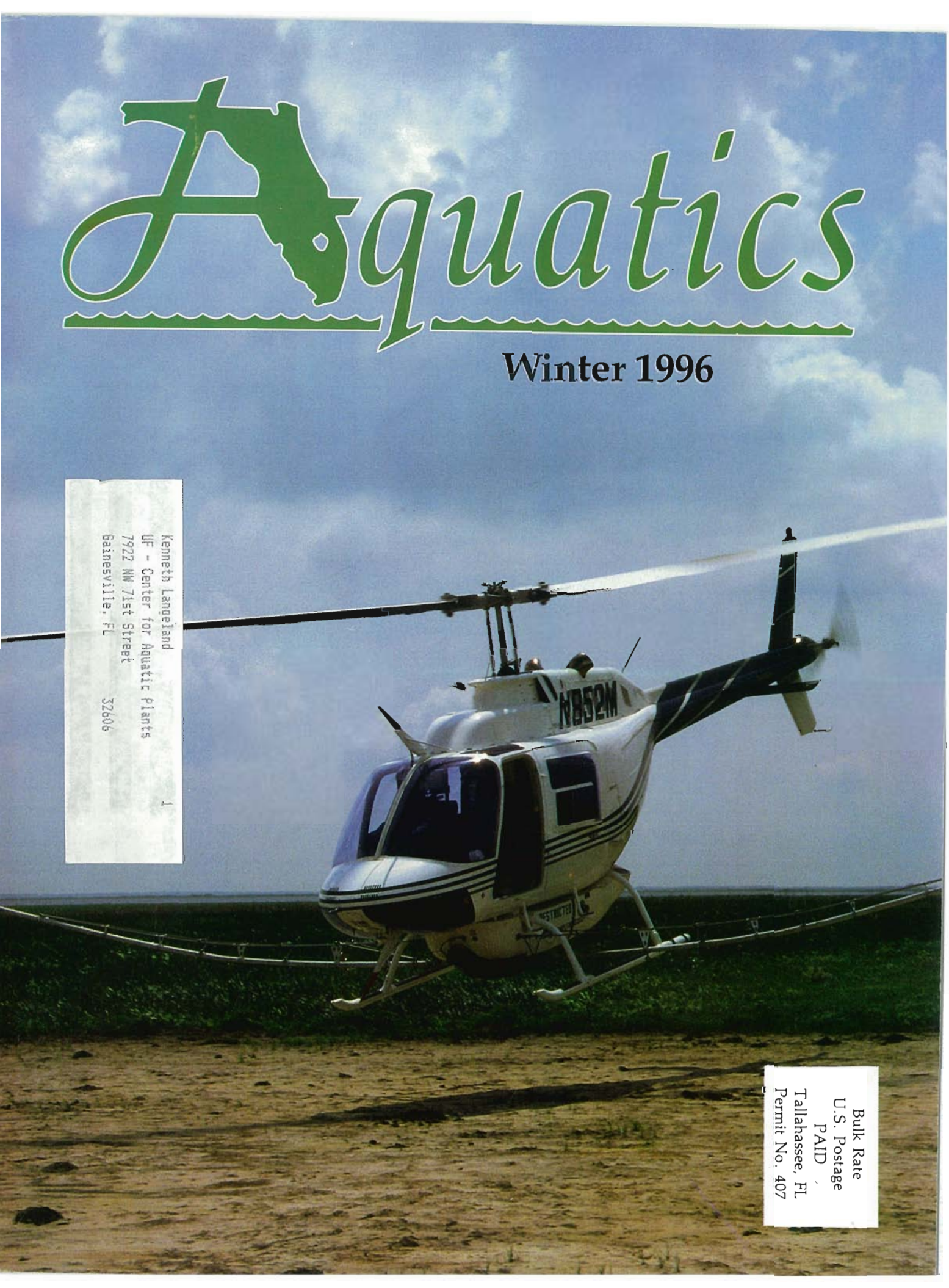
# Aquatics

**Winter 1996**

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## Letter to the Editor

I would like to thank all the people that were involved in arranging and making the 20th Annual FAPMS Meeting in Ft. Myers such an enormous success. Next years' meeting has a hard act to follow but I am sure we can meet the challenge.

In the field of Aquatic Plant Management, I feel confident that the State of Florida is, and will continue to be, one of the front-runners in technology and innovation only if we collectively set an example of commitment and professionalism that far exceeds our legal requirements not just to the safety of individuals but of the environment as well.

As the "new kid on the block," I don't have all the answers to all the questions, but you don't need a crystal ball to know that the success of an organization as diverse and geographically spread out as ours is dependent SOLELY on the hard work, dedication and commitment of its many members. I first joined the society as a field applicator in the early 80's and felt then,as I do now, it is a privilege to be part of the largest working group of aquatic plant managers in the country. I know of no higher honor than to be elected as the President of *YOUR* society and promise to do all that I can to fulfill the needs of the many, but I need YOUR help.

This being an applicator society, I feel that it should be supported and driven by applicators and this means you! If you haven't signed up for one of the committees, *READ* your newsletters to find out what is going on or attend quarterly meetings of the Board of Directors. If you have ideas relevant to legislative efforts or state funding drives, be a part of the solution and let us know your needs NOW when it can make a difference! If you feel that the scope of the society should be broadened or if you have ideas that you feel would benefit the society let someone know. It is one of my goals as President to increase communications within the society and that needs you to get more involved . Add to the collective learning process. To paraphrase John F. Kennedy...."Ask not what your society can do for you .....ask what you can do for your society...." Tell me at: ErnestFeller@SFWMD.GOV or 407-847-5067.

Cover: Lake Kissimmee littoral habitat restoration. Photo by W. T. Haller

Aquatics

Winter 1996/Vol. 18, No. 4

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EDITORIAL: Address all correspondence regarding editorial matter to Ken Langeland *Aquatics* Magazine.

*Figure 3. Close-ups of the compound umbel inflorescence of water dropwort.*

# Water Dropwort

**by**
**D. Lamar Robinette**
**Clemson University**
**and**
**David L. Sutton**
**Fort Lauderdale Research and Education Center**
**University of Florida - IFAS**

**Introduction**

Aquatic plants are unique in that they require water in greater amounts than other plants to grow and complete their life cycles. Nowhere is this more evident than in South Florida where vast tracts of land are covered with water for long periods. Aquatic plants thrive under these watery conditions which many other plants cannot tolerate.

Aquatic plant research studies at the University of Florida's Fort Lauderdale Research and Education Center seek to provide information on aquatic plants unique to this part of the state. Compared with wetlands in South Carolina and in neighboring southeastern states, south Florida has an overwhelming wealth of native and exotic plants. The semitropical environment of the region provides ideal conditions favorable for growth of many plant species.

Information is available on aquatic weeds such as hydrilla and waterhyacinth which infest many bodies of water throughout the state, but little is known of the obscure native aquatic plants so vital to the ecological health of south Florida wetlands. One such plant is water dropwort *(Oxypolis filiformis* (Walt.) Britt.), an herbaceous, dicotyledonous plant in the Carrot family (Umbelliferae or Apiaceae).

**Family Characteristics**

The Umbelliferae family boasts approximately 200 genera and more than 2,900 species. Plants in this family grow mainly in northern temperate regions of the world. Only a few species of the carrot family occur in the tropics. The carrot family contains important food, spice, and ornamental species. This group also includes some of the most poisonous plants in the world such as waterhemlock (*Cicuta mexicana* Coult. & Rose) and poison-hemlock (*Conium maculatum* L.). Food and spice plants in this family include dill, celery, caraway, coriander, carrot, fennel, lovage, parsnip, parsley, and anise. Queen Ann's lace (*Daucus carota* L.), also called wild carrot, is perhaps the most famous of the many ornamental plants of this family.

Members of the carrot family are readily distinguished by their aromatic herbage, usually sheathing

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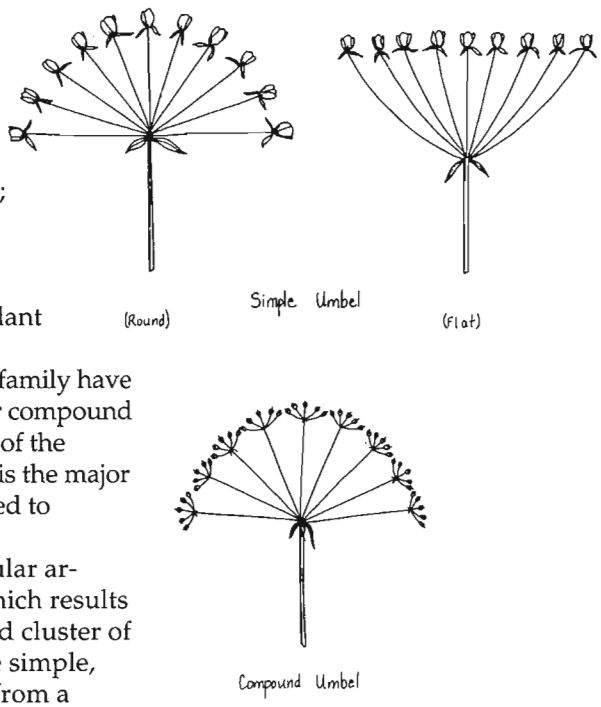
petioles, and umbellate inflorescence. These plants are mostly herbaceous, with many species that have hollow stems at maturity. Leaves of these plants are usually alternate, but some have opposite leaves. Their leaves are generally compound or divided, but some are simple, and others are phyllodial. Phyllodial leaves have no leaf blade; they are petioles that function as leaves. The petiole is the stalk that connects the leaf to the plant stem.

Members of the carrot family have small flowers in simple or compound umbels - hence the origin of the family name. The umbel is the major morphological feature used to characterize these plants.

The umbel is a particular arrangement of flowers which results in a flat, convex, or round cluster of flowers. Umbels may be simple, flower stalks all arising from a common point, or compound, flowers stalks on the same stem arising from multiple points (Figure 1).

*Figure 1. Schematic diagram of a simple umbel showing a round and flat arrangement (upper), and a compound umbel (lower). (Drawings by Ann Murray)*




**Genus Characteristics**

Plants in the genus *Oxypolis* are commonly called "hog-fennels," apparently because of the attraction which hogs have to these plants. Hog-fennels are erect, glabrous, perennials with dense fibrous root systems. They are separated from other members of the carrot family by three major characteristics. First, the stems of hog-fennels are relatively robust and stiff. Second, their leaves consist of phyllodes with hollow spaces between septa (a wall separating the hollow spaces), or the leaves are divided in a feathery manner, or compound and growing in groups of threes. Third; long, slender, threadlike bracts are present at the base of their inflorescence.

Four species of hog-fennels occur in Florida. Water dropwort and purple dropwort (*Oxypolis greenmanii* Math. & Const.) both have phyllodial leaves, but are separated from each other by the color of their flower. The petals of water dropwort are white while those of *O. greenmanii* are garnet-maroon. Purple dropwort plants exhibit leaves that are more cylindrical and jointed than water dropwort. Purple dropwort is a rare endemic which exists in only a few West Florida counties. The other two species, cowbane (*Oxypolis rigidior* (L.) Raf.) and *Oxypolis ternata* (Nutt.) A. Heller, are separated on the basis of the shape of their leaves.

**Water dropwort Characteristics**

Water dropwort, when viewed from a distance, appears similar to Queen Ann's lace and waterhemlock because of the white flowers arranged as compound umbels. However, the general appearance of water dropwort is different from these two plants. The leaves of water dropwort are smooth, bladeless stalks called phyllodes (Figure 2). The phyllodia, or leaves, are hollow, partitioned by walls, and are not conspicuously jointed or brittle, though the partitions are visible as rings around the phyllode.

The stems of water dropwort are up to 6 feet tall, slender, and striated, with few branches. The lower leaves are elongate and taper to 2 feet in length. The flowers are small and white (Figure 3). The inflorescence is up to 5 inches in width. The individual flowers are small, less than 0.1-inch in width, with 12 to 22 occurring in the compound umbel.

**Distribution of Water Dropwort**

Water dropwort grows in shallow water, and is probably the most common of the four species of hog-fennels in Florida. Its tolerance to drying is unknown, but the areas in which it occurs undergo periodic drying. Plants occur in the coastal plains from North Carolina to southern Florida, west to Texas, and in the Bahama Islands.

Water dropwort may be found in the Shark Valley area in the Everglades National Park (Figure 4). If you visit Shark Valley, walk, bike or take the tram around the 15-mile loop road leading to the observation

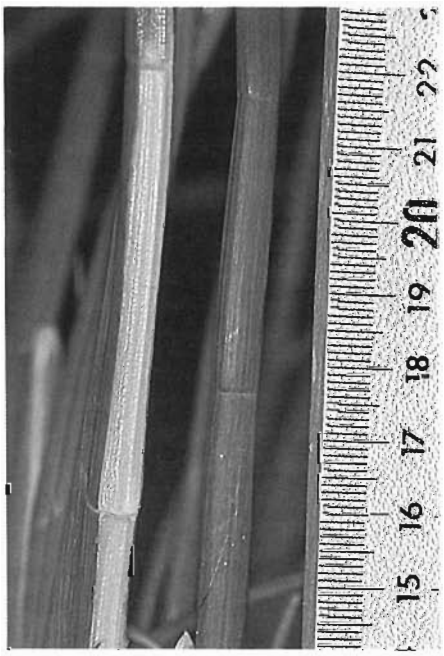



*Figure 2. Phyllodial leaves of water dropwort. The leaf on the left has been cut horizontally to shows its hollow anatomical feature. The one on the right shows the partitions as rings around the phyllode. Scale on the right is centimeters.*

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tower. Along the road, built in 1946 for drilling by Humbel Oil (Exxon), you will see many water dropwort plants.

### Ornamental Value of Water Dropwort

We demonstrated the ornamental value of water dropwort by planting small plants grown from rhizomes in standard commercial 1-gallon plastic pots. An ounce of Sierra fertilizer (17-6-10) plus minors was placed as a layer in the middle of each of three pots filled with sand. The pots were then placed in a large plastic tub 27 inches in width by 27 inches in length by 16 inches depth filled with tap water (Figure 5). The water dropwort plants joined a collection of waterlilies and a large hibiscus in the courtyard of the University of Florida's Fort Lauderdale Research and Education Center. The largest of the three water dropwort plants grew to about 4 feet in one growing season. They are attractive in an odd way, resembling giant green onions. With proper placement, water dropwort could be a star in the aquatic ornamental landscape.

*Figure 4. Water dropwort plants grow in an abundance along the bike trail in Shark Valley in this picture taken in June 1996.*


### Acknowledgments

Contribution of the University of Florida's Fort Lauderdale Research and Education Center. Published as Journal Series Number N-01278 of the Florida Agric. Exp. Sta. Mention of a trademark or a proprietary product does not constitute a guarantee or warranty of the product by the University of Florida and does not imply its approval to the exclusion of other products that also may be suitable.


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*Figure 5. Water dropwort plants being grown as an aquatic ornamental at the University of Florida's Fort Lauderdale Research and Education Center.*

# "Barley Straw for Algae Control" A North Carolina Experience

**by**
**Stratford H. Kay,**
**Associate Professor**
**North Carolina State University**
**Raleigh, NC**

I would like to respond to the article "Barley Straw for Algae Control", by Eldridge Wynn and Ken Langeland, which appeared in the Fall 1996 issue of Aquatics. First, I must compliment the authors on an interesting and exceptionally well written review of an algae management technique that apparently is being used successfully in some areas of Ireland, Scotland, and England. Before getting too excited about this non-chemical algae control procedure, however, let's consider some facts. First (as the authors pointed out), there are differences between climate here and in Ireland and other areas in the UK in which the technique apparently has been successful. I am not aware of anything that has been published that even suggests that straw treatment has been used successfully for algae control in the US and would be very concerned if we began to use and recommend the procedure without further evaluation. Second, what works in the laboratory doesn't always work in the real world for a number of possible reasons. As a case in point, I would like to relate my own personal experience with straw treatment for algae control.

I first heard about the use of barley straw for algae control through the "grapevine" in 1992, when a county agent called me and said that he had received a call from a lady about something she had seen in a gardening magazine. I asked the county agent to follow up on this and try to get a copy of the information. To date, I am not sure of the source of the information, but it was only three sentences in length and may have been part of another article. I decided to try this myself.

My research technician and I initiated an experiment in the summer of 1992 in which barley, wheat (also indicated in some of the published literature to suppress algal growth), rye (well known to suppress weeds in terrestrial cropping situations) and straw were applied at rates of 0, 2, or 4 bales per acre. The test was fully replicated. We placed the straw into "sausages" constructed of bird netting and anchored them in place around the margin of algae infested ponds. Over the remainder of the growing season, and well into 1993, we observed the straw-treated ponds. During the course of this test, filamentous algae grew over, under around and through the straw "sausages". If the straw "sausages" had released anything that could suppress algal growth, I would have expected at least to have seen some suppression on their surface and in the immediate vicinity surrounding them. It was very obvious that this did not occur. Obviously, our test was a complete flop. Since we did not have any funding for this work, we discontinued the study. About two years later, while passing by along the highway, I happened to notice one of the ponds still contained its "sausage" of straw, more or less intact. The water was clear, and algae was everywhere. The *Aquatics* article has prompted us to reconsider how we did our study and to examine more closely the possible reasons for its failure, particularly since I have received several calls recently about the procedure. In fact, we now are considering re-opening this project. For those of you who may be interested, I will share some of my thoughts on the subject.

There seem to be several potentially good explanations why our 1992 experiment failed. First, we noted that the straw "sausages" did not decompose. Most likely this was the result of placing too much straw into a "sausage" (we had up to two bales per sausage). This would have prevented good water circulation through the straw and created anaerobic conditions inside of the "sausages". These conditions, in turn, would have inhibited growth of the microorganisms which are important in decomposition of the straw and affect the release of the compounds that suppress algal growth. Future research definitely needs to examine carefully how much straw to put into a "sausage" and how to contain it in a manner more conducive to water circulation and promotion of aerobic internal conditions. Second, straw treatment, as noted by Wynn and Langeland in the article, is a preventive rather than curative treatment. All of our test ponds contained substantial growths of filamentous algae and probably should have been treated with an algicide before applying the straw. This, at least, would have made evaluation easier. Third, we also selected ponds that had difficult algal species that usually require diquat treatment for successful control (all contained *Pithophora* sp. except one, and one contained both *Pithophora* and

*Spirogyra*). Perhaps, if we had chosen ponds with growths of other, less difficult species, we might have had better results. Fourth, the maturity of the straw when cut may have had an impact on its weed suppressive abilities. We have no idea of when the straw was cut, except that we noted some seed heads on the wheat straw. This is a big uncertainty that needs to be investigated further. Fifth, we must consider that differences in water quality may be important, particularly as water quality influences algal species composition and also might influence microbial population growth, straw decomposition, and even production of the microbial byproducts that are responsible for algal growth suppression. This has not been reported and should be investigated. We also do not know if our application rate was sufficiently high. Finally, we may have to consider such factors as the source, variety, and condition of the straw, and the possibility that pesticide residues on the straw could influence microbial growth. Most likely, the cause of our failure was due to a combination of several of these factors. Maybe it just doesn't work in our warmer, sunnier, climate. Needless to say, more research is needed.

If future research should demonstrate that barley (or other) straw treatment is a viable algal control technique in the US, we would have a more cost-effective preventive treatment and could avoid substantial time and monetary investment in application of algicides. This also would be beneficial from the environmental standpoint in terms of potential fish toxicity (copper), elimination of water use restrictions due to the need to treat difficult algae with diquat, reduction of likelihood of fish kills resulting from severe oxygen depletion following algicide applications, and the general public concern about repeated chemical applications for weed control. Well, anyhow, the technique sounds nice, if we can get it to work.

If you have tried this (either successfully or unsuccessfully), I would be interested to hear about your experience. Please feel free to contact me at (919)515-5 645, fax 515-5315, by e-mail skay@wolf.ces.ncsu.edu, or by mail at the Crop Science department, Box 7620, North Carolina State University, Raleigh, NC 27695, USA. I especially would be interested in how you applied the straw, how much was used per acre, the timing and frequency of treatments, and any additional information you might have about the treatment site (e.g., locale, water temperature, water quality, etc.). In the mean time, I highly recommend that County Agents, consultants, fishery biologists and others should not recommend this procedure until it has been evaluated by qualified aquatic weed scientists in properly designed (and repeated) scientific studies.

# Pondering the Pond-lilies: relationships within the genus Nuphar

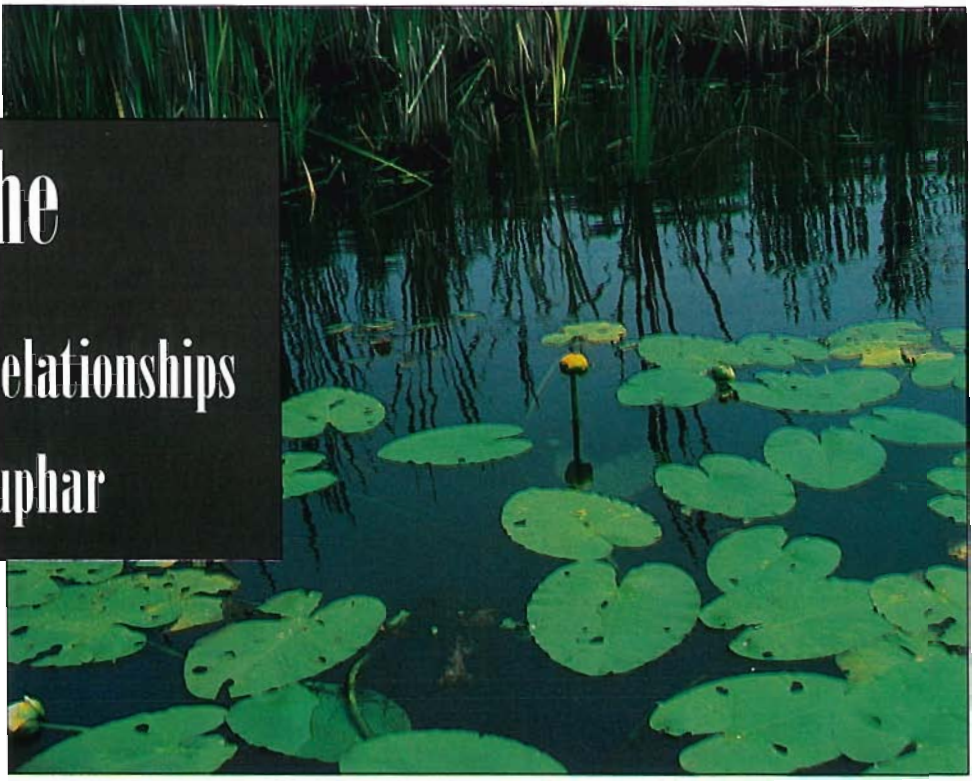

*Figure 1. Habit of Nuphar variegata.*

**by**
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**Department of Plant Biology**
**University of New Hampshire**
**Durham, New Hampshire 03824**

**Introduction**

Water-lilies have held the fascination and admiration of people for centuries. They have been revered as sacred in some cultures, alluding religious associations, while their artistic portrayals have decorated noblemen, temples, and tombs (Sculthorpe 1967). The use of the more showy water-lilies for ornamental purposes is undatable. Their cultivation in pools and aquaria has remained fashionable, and recently has become a garden trade specialty.

The pond-lilies (yellow water-lilies, cow-lilies, spatterdocks) include all the species assigned to the genus *Nuphar* (Nymphaeaceae). Like most water-lilies, *Nuphar* species are perennial hydrophytes characterized by large flowers and thick, floating leaves (Fig. 1). They inhabit freshwater lakes, ponds, and sluggish watercourses and are distributed in the temperate climate of the Northern Hemisphere. Overall, *Nuphar* has had its fair share of consideration, despite its admittedly less spectacular floral display. Stems and leaves of the pond-lilies have been traditionally used in folk medicine, their seeds and stems have furnished staple foods, and the large flowers and foliage have afforded ornamental cultivation. *Nuphar* plants have served as research specimens for countless inquiries of chemistry, ecology, and physiology.

**The problems**

Despite all of the attention this group of plants has received over the years, *Nuphar* is renown as one of the most taxonomically difficult and poorly understood groups of plants in the Nymphaeaceae. Taxonomic concepts of *Nuphar* species offered by scientists remain inconsistent and therefore at times confusing. For example, from a look at the three most recent studies (within a mere 70 year span), the number of North American *Nuphar* taxa alone has ranged from 5 to 19 (including varieties). Most disconcerting is that the number of North American species has ranged from one to 17 (Morong 1886; Miller and Standley 1912; Beal 1956).

There are several difficulties in the genus overall that presumably result in the difference of opinion regarding the classification of *Nuphar*. *Nuphar* plants exhibit an enormous amount of morphological variation within any given population or species. Species of this genus remain similar in appearance, given the difference in size, number of floral parts, and various leaf characteristics. The uniform chromosome number of all species offers no information to aid in their classification. Also, *Nuphar* species possess the capacity for natural hybridization. This close relatedness among members, along with their inherent variability, has hindered a clear understanding of evolutionary relationships within this genus.

**Classification**

The most recent detailed classification of *Nuphar* has remained arguable by many botanists (Beal, 1956). In contrast to the traditional conviction of multiple *Nuphar* species, E. O. Beal recognized only a single variable species, *Nuphar lutea*, within North America and Europe. This inclusive species was repre-

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sented by eight subspecies in North America and two subspecies in Eurasia. World wide, Beal's classification did acknowledge two distinct species, the Far Eastern *N. japonica*, and *N. lutea* (Beal 1955). Prior to Beal's (1956) study, 17 *Nuphar* species were proposed for North America alone.

Past systematic studies of *Nuphar*, like the one of Beal, have been limited to traditional morphological techniques. Such techniques were used to classify plants solely on the way they appear physically, not necessarily how they may be related. Hence, since most *Nuphar* species are superficially very similar to each other, Beal was led to believe that they would be best regarded as one species with several extreme forms. He designated these (presumably closely related) forms as subspecies. This enormous variability of form within any (or between) species has consequently rendered *Nuphar* to be problematic from a taxonomic standpoint. Fortunately, many new approaches now exist to help analyze relationships among plant groups where the emphasis is not placed on the physical characteristics of the plants.

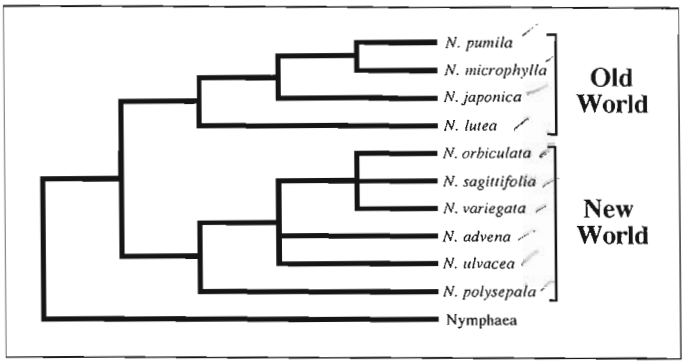


*Figure 2. Tree diagram of Nuphar relationships based on DNA comparisons. Two major lines are evident, the Old World species and the New World species.*

**Relationships**

While systematic classifications of *Nuphar* species have been relatively numerous, no attempt has been made to explicitly estimate evolutionary positions of the species within this genus. Estimating the evolutionary relationships among *Nuphar* plants greatly aids in formulating an accurate taxonomic classification (i.e. one that reflects their natural relationships). Thus, the primary objective of my study was to explore the evolutionary relationships among the members of *Nuphar* from DNA evidence. By comparing the "nucleotide" sequence of a specific segment of DNA (a gene) between every *Nuphar* species, a genealogy or family tree of the genus can be reconstructed. This technique of molecular biology affords an approach in which the reliance on potentially misleading morphological similarities can be circumvented. I chose to examine a gene (known as the ITS region) that occurs in the cell nucleus. I have also constructed an

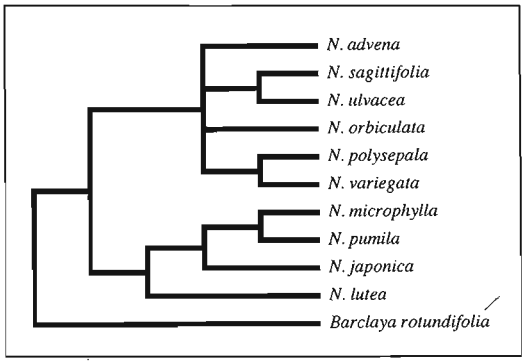


*Figure 3. Tree diagram of Nuphar relationships based on morphology. Similar to the DNA genealogy, two major lineages are evident.*

evolutionary "tree" based on the morphology of members of *Nuphar* for comparison.

Figure 2 shows the evolutionary tree that resulted from my molecular analyses. The results of my DNA study provide very strong evidence that there are two major lineages in *Nuphar*. Interestingly, this relationship is also consistent with morphological evidence (Fig. 3). One lineage contains all the species native to Eurasia but includes the North American *N. microphylla*. These species all have five sepals, smooth walled, flagon-shaped fruits with conspicuous necks, and relatively short anthers (Table 1). The other major lineage consists of all the North American species (except *N. microphylla*). These taxa all share 6-12 sepals, ribbed-walled, barrel-shaped fruits lacking necks, and relatively long anthers (Table 1). The definition of these two groups represents the most important and well supported result of both the molecular and morphological analyses. These results suggest that features of fruits (overall shape and surface texture) (Figs 4-5), relative anther length, and the number of sepals are good indicators of kinship among *Nuphar* species.

In the Old World lineage, the so-called "dwarf" species (*N. pumila* and *N. microphylla*) form a natural group, descended from a common ancestor. They appear to be most closely related to the Eurasian species *N. japonica*. Interestingly *N. microphylla*, while bearing Old World affinities, is restricted to North America. All species of the Old World lineage, with the exception of *N. lutea*, possess lobed, or star-shaped, stigmatic disks. What separates this species from those other species with Old World affinities is the unique feature of an entire margined, or round, stigmatic disk. Resolution is much weaker among New World (North American) species in both analyses. From the DNA study, greatest support is found for the remote relationship

*Figure 4. A fruit of Nuphar advena which is characteristic of the 'New World' lineage.*

between *N. polysepala* and other New World species. This is a plausible relationship since *N. polysepala* is the western representative of the genus in North America and is unique in having 9-12 sepals. The branch maintaining relationships among the remaining North American species is weakly supported and virtually unresolved. The present DNA data are inadequate to elucidate further relationships among these species.

**The Bottom Line**

My results clearly indicate that no North American plants (except *N. microphylla*) share any close degree of relationship with *Nuphar lutea*. The taxonomy established by Beal (1956), acknowledging but a single species (*Nuphar lutea*) in Europe and North America, is therefore erroneous. This is so because Beal's concept of *N. lutea* is "polyphyletic", meaning that within this one species various subspecies have descended via different ancestral lineages. Classifying these lineages into one species would create an unnatural group, which is an unwarranted option in taxonomy. Accordingly, no North American (nor most Eurasian) populations of *Nuphar* should be referred to as *N. lutea*.

This analysis of *Nuphar* represents the first study to propose explicit evolutionary relationships among the different species. It also constitutes the first taxonomic study of this genus to utilize molecular evidence. While the evolutionary trees do little for proper field identification of *Nuphar* populations, the relationships portrayed by trees will greatly contribute to the formulation of an accurate *Nuphar* classification. A revised classification of *Nuphar* will be forthcoming.

*Figure 5. A developing 'Old World' fruit (N. pumila).*

**Table 1. Association of some morphological features among the two evolutionary lineages of *Nuphar*.**

| New World Lineage | Old World Lineage |
|---|---|
| 6 - 12 sepals | 5 sepals |
| round stigmatic disk | round to lobed stigmatic disk |
| fruits barrel-shaped | fruits flagon-shaped |
| ribbed fruit wall | smooth fruit wall |
| slight constriction below stigmatic disk | great constriction below stigmatic disk |
| anther longer than filament | anther shorter than filament |

**Acknowledgments**

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# *Juncus effusus* subsp. *solutus* Fern. & Weig:

# Our Native Soft Rush

by
Ken Langeland
UF/IFAS Agronomy Department
Center for Aquatic Plants
Gainesville, FL

Soft rush (*Juncus* spp.) is a common plant of wet soils in Florida and throughout the world. It occurs in many wet habitats, including freshwater marshes, meadows, sloughs, wet depressions and shores. While it is sometimes considred a weed in wet pastures, it is considered a native plant to Florida and commonly used in wetland mitigation, restoration, and littoral shelf plantings.

Taxonomy of this group has varied widely amoung authors and up to 10 taxa have been variously named worldwide. Because soft rush is cosmopolatin and its taxonomy has been uncertain, confusion has arisen over its geographic origins. When it was recently labeled "exotic" on the widely distributed UF/IFAS "Aquatic Plant Identification Deck", concern was expressed by many who use the plant for native wetland plantings. However, the subspecies that commonly occurs in Florida and is used for planting is our native soft rush, *Juncus effusus* subsp.*solutus* Fern. & Weig.

The currently accepted taxonomic description of soft rush is found in:

Hämet-Ahti, L. 1980. The Juncus effusus aggregate in Eastern North America. Ann. Bot. Fennici 17:183-191.

Hämet-Ahti defines two taxa indigenous to eastern North America and two European taxa (Table 1). One of the European taxa, *J.effusus* subsp. *effusus*, has naturalized in Newfoundland, Nova Scotia, British Columbia, and possibly elsewhere,

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which is the probable cause for confusion on the origin of our native species. Stem anatomy and form of perianth segments and capsules are used for this taxonomic treatment rather than features such as lengths and diameters of bracts and culms, forms of inflorescenses, and lenghts of perianths and capsules. Copies of the paper by Hämet-Ahti can be obtained by contacting the Aquatic Plant Information Retrieval System at 352/392-9614 or kpb@gnv.ifas.ufl.edu.

**Table 1. The juncus effusus aggregate in Eastern North America**

Adopted from: Leena Hamet-Ahti
Ann. Bot. Fennici 17:183-191. 1980

| | SYNONYMY | ORIGIN | DISTRIBUTION |
|---|---|---|---|
| *J. palaei* | *J. effusus* var. *pylaei*<br>*J. effusus* var. *costulatus*<br>*J. effusus* var. *decipiens* | North America | more oligotrophic sites, temperate to warm temperate |
| *J. conglomeratus* | *J. effusus* var. *conglomeratus*<br>J. effusus var. *compactus* | Europe | few specimens, temperate |
| *J. effusus* subsp. *effusus* | *J. effusus*<br>*J. effusus* var. *subglomeratus*<br>*J. effusus* var. *compactus* | Europe | aggressive and fully naturalized, temperate |
| *J. effusus* subsp. *solutus* | *J. effusus* var.*solutus*<br>*J. griscomii* | North America | common, Canada to Mexico |

*More on the Hyphen: The following is reprinted from the "Water Hyacinth Newsletter of the International Institute of Biological Control"*

# AND FINALLY...WHAT WAS THE NAME OF THAT WEED...?

Are you working on water hyacinth or its very close relative waterhyacinth? The title of this newsletter uses two words, and this writer consistently, though for no particular reason, refers to the *Eichhornia crassipes* common name as two separate words - water hyacinth. However, many weed researchers join the two words together.

The definitive review of *E.crassipes* biological control published by Ken Harley in 1990 consistently splits the words. However, Gopal in his excellent and comprehensive book on the weed calls it waterhyacinth, except in a few places where he unaccountabley decides to call it Water Hyacinth!

A search of the CAB Abstracts CD-ROM database for the years 1984 to 1991 inclusive revealed 469 citations under water hyacinth and only 50 under waterhyacinth. So it would seem that the two-word form wins - at least by popular usage.

Looking for the definitive answer, I turned to D.J. Mabberly, "The Plant Book" (Cambridge University Press, 1990 printing), to find the following under the entry *Eichhornia*...

"*E.crassipes* ((C.Marius) Solms-Laub. (water-hyacinth)".

What's in a hyphen?

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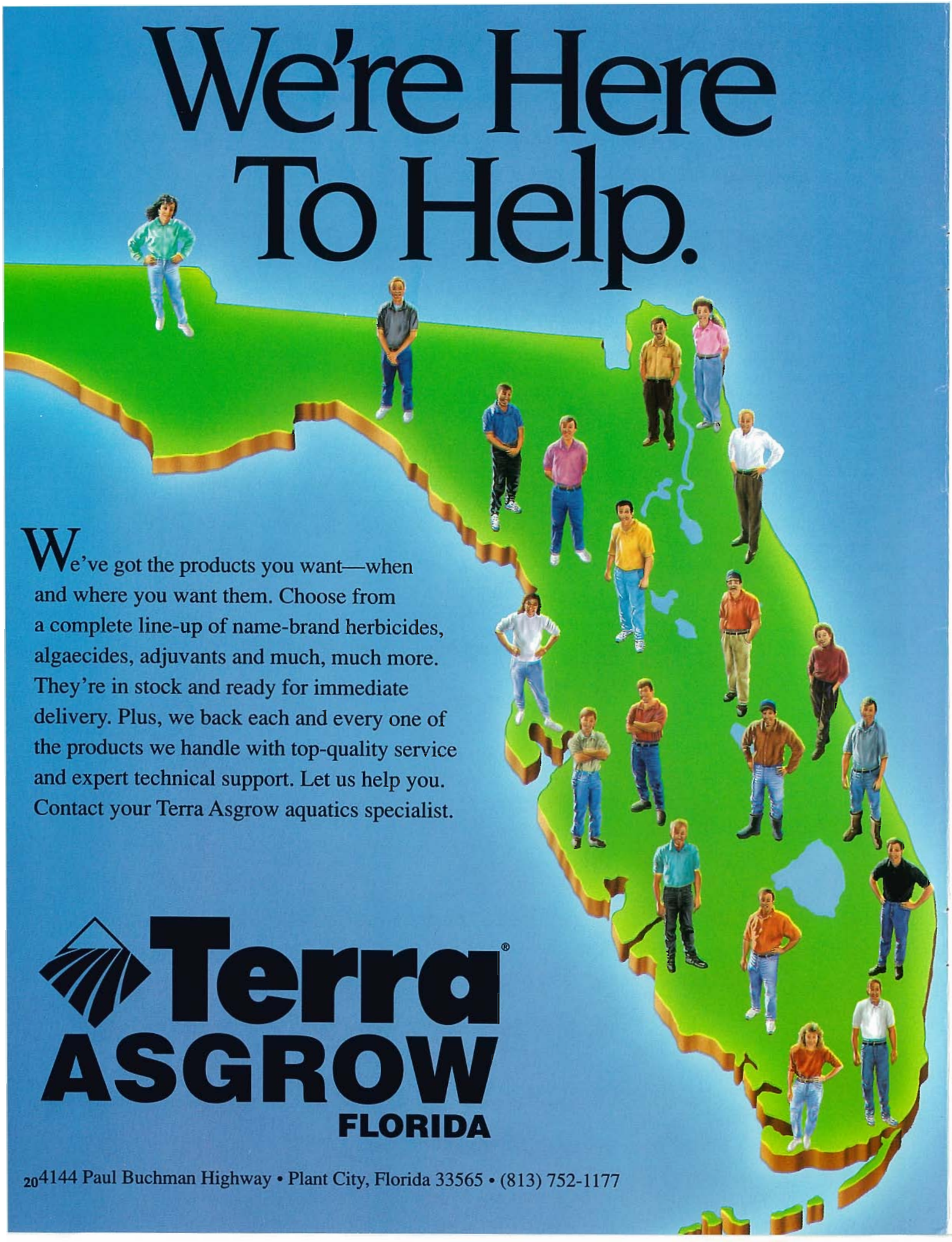

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### MEETINGS

Southern Weed Science Society Annual Meeting, Houston, Texas, January 19-20, 1997.

Weed Science Society of America 1997 Annual Meeting, Orlando, FL, Clarion Hotel, February 2-6, 1997.

Florida Weed Science Society Annual Meeting, Orlando area, site TBA, February 27-28, 1997.

IFAS Center for Aquatic Plants 1997 Research Review and Aquatic Plant Managers Workshop, University of Florida J. Wayne Reitz Union Auditorium Gainesville, FL, March 11-12, 1997, Contact the IFAS Office of Conferences & Instutes at 352/392-5930.

Aquatic Weed Control, Aquatic Plant Culture and Revegetation Short Course, Rolling Hills Hotel and Fort Lauderdale Research and Education Center, Fort Lauderdale, FL, May 12-15, 1997, Contact the IFAS Office of Conferences & Instutes at 352/392-5930.

**Potable water SLN for AQUATHOL K in Florida**

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# You Might Be a "Nozzle-Head" If*

**by Orifice P. Nozzle-Head**

If your best Sunday go to church hat has an aquatic herbicide logo on it.

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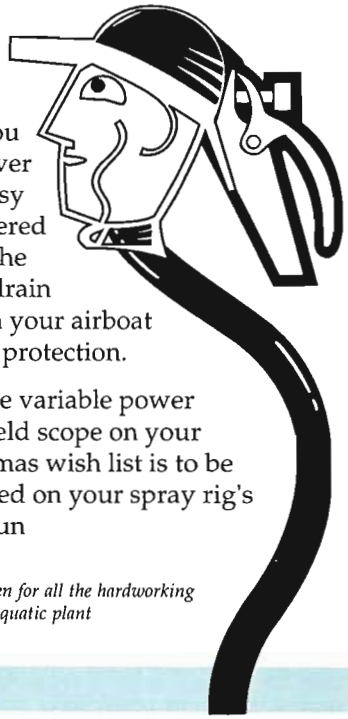
If you find yourself explaning that the fish kill due to the DO problem does not mean the fish took a drug overdose.

If you have ever serioulsy considered using the spare drain plug in your airboat for ear protection.

If the variable power widefield scope on your Christmas wish list is to be mounted on your spray rig's handgun



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*Hopefully to be considered as light humor by most, this column is written for all the hardworking and caring professionals who dedicate their work afield to excellence in aquatic plant management. David Tarver*


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