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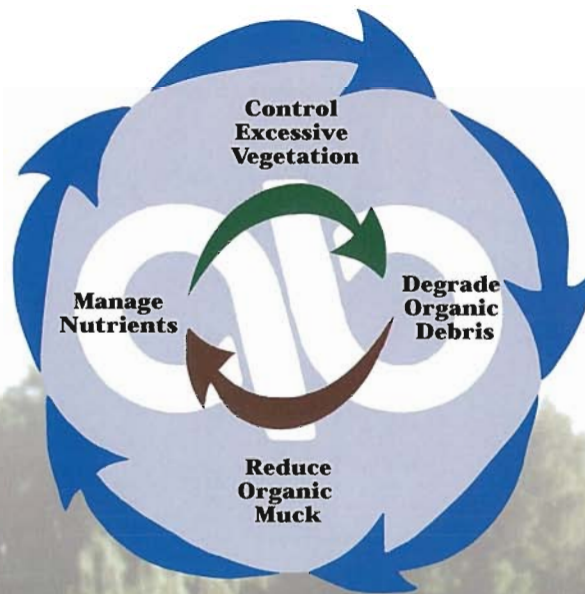
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Editorial
As It Looks to Me

by John Carew
Michigan State University

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*American Vegetable Grower Vol. 8,
No. 1, January 1960*

Pickles can kill you! Every pickle you eat brings you nearer to death! Amazingly, most intelligent people have failed to grasp the obvious significance of the term "in a pickle."

Although leading horticulturists have long known that *Cucumis sativus* possesses an indehiscent pepo, the pickle industry continues to expand.

Pickles are associated with all major diseases of the body. They can be related to most airline tragedies. There exists a positive relationship between crime waves and the consumption of this fruit of the cucurbit family.

Nevertheless, more than 120,000 acres of fertile U.S. soil are now devoted to the production of the pickling cucumber and our per capita consumption is nearly 4 pounds.

The harmful effects of pickles can be conclusively proven using a method of logic widely acclaimed by certain government officials and commonly observed in TV commercials.

Recent surveys have shown:

... that 86.8% of all Russian sympathizers have eaten pickles.

... that 79.7% of the people involved in traffic accidents con-

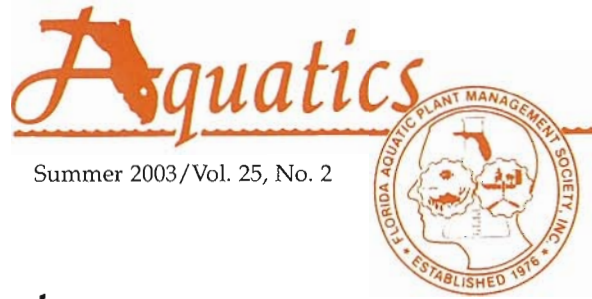
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Despite heavy winter rains, a multi-agency effort and mother nature enabled the Kissimmee Chain of Lakes large-scale hydrilla treatments to occur in the drier months of April and May 2003. The

helicopter has become an invaluable tool for efficient and timely herbicide application. Photo by Jeff Schardt



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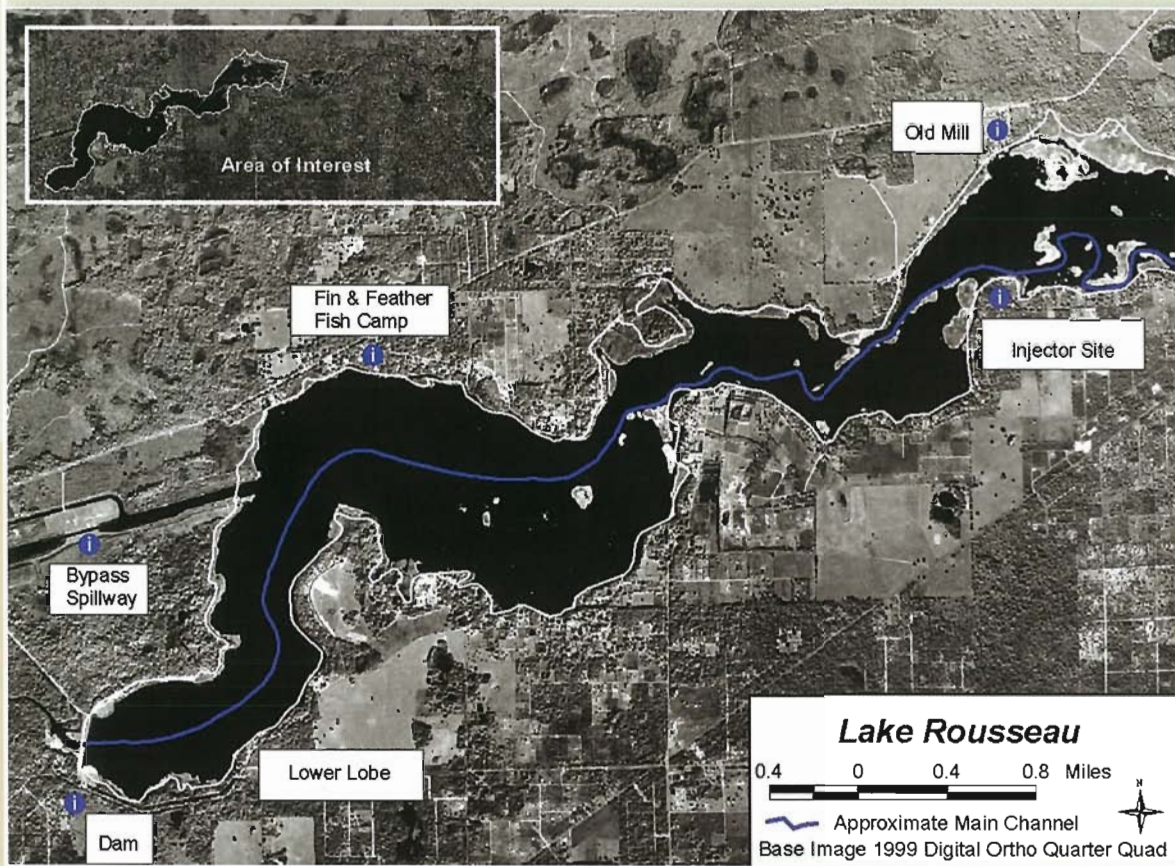


Figure 1. Lake Rousseau

The Lake Rousseau Sonar (fluridone) Drip Treatment

by Terry Sullivan

Introduction

During the last three years our state has experienced one of the worst droughts in its history. This has provided some unique opportunities to treat hydrilla in flowing water systems. Part of the Withlacoochee River system has been dammed for the past century creating Lake Rousseau, a 4,000-acre, flowing

water reservoir with a stabilized water level (Figure 1). Lake Rousseau has flows that normally range from 1000 cfs to 1500 cfs, but during the recent drought, flows declined to approximately 500 cfs (cubic feet per second). An herbicide (fluridone) drip treatment was designed for Lake Rousseau to treat its hydrilla infestation (Figures 2 and 3) during this low flow period. The fluridone drip treatment encompassed the western 2,500-acre open-water area of the lake. With this treatment we found that managing hydrilla in flowing water systems presents an enormous challenge to the aquatic herbicide applicator.



Figure 2. and 3. Hydrilla infestation on Lake Rousseau



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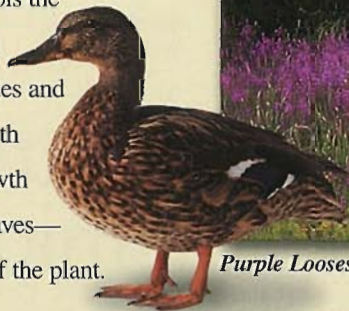
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Renovate was developed to control submersed, emersed and floating aquatic plants such as:



Eurasian Watermilfoil



Alligator Weed



Purple Loosestrife



Water Hyacinth



Untreated 1 week after treatment 4 weeks after treatment
Eurasian Watermilfoil treated with Renovate (1 ppm), shows the eventual collapse of the plant structure below the surface of the water.

And because Renovate is very effective on broadleaf plants, while leaving beneficial native grasses untouched, it accelerates habitat "renovation."

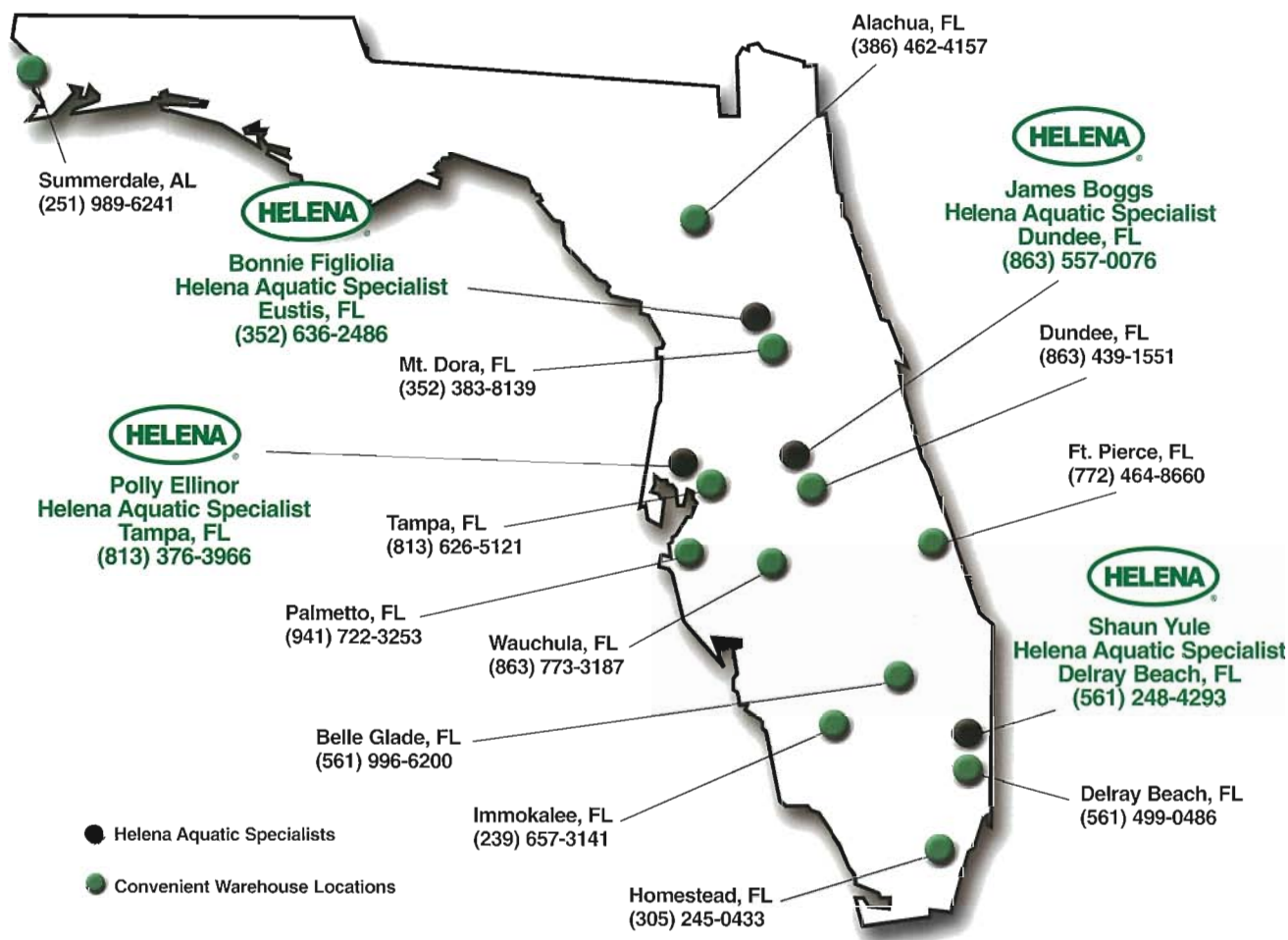
Renovate's selective, systemic chemistry is an outstanding partner in rotation with biological control agents and is an excellent choice for use in Integrated Pest Management (IPM) programs. And Renovate's formulation is compatible with other aquatic herbicides, adjuvants, and surfactants providing greater application flexibility—outperforming comparable application programs.

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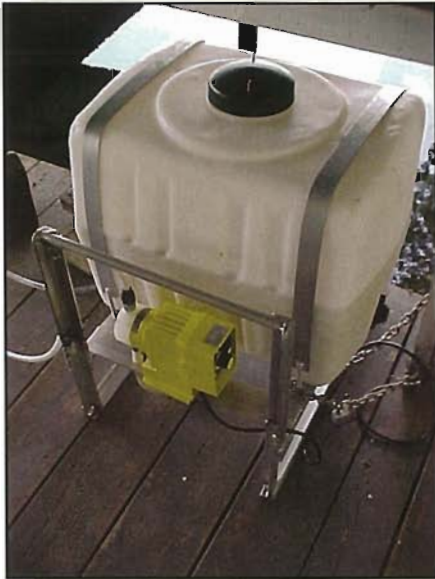


Figure 4. 30-gallon injection system.



Figure 5. The 2002 Lake Rousseau hydrilla treatment was a success.

Methods

In order to conduct the drip treatment in Lake Rousseau a large capacity precision injector was required. SePro Corporation, the company from which the fluridone was purchased, provided assistance in planning as well as providing a 30-gallon precision injection system (Figure 4). Sonar A.S. (aqueous fluridone) was the formulation selected to conduct the hydrilla treatment.

The location of the injector was our first major decision. The chosen site was a lakeside residence situated about half way up the lake on the south side, where the old river channel approaches close to the shoreline (Figure 1). This location placed the injector near the eastern open-water areas of the lake, and allowed for good dispersal of the fluridone throughout the western portion of the lake. The assistance and amenities provided by the homeowner at this residence proved invaluable to the treatment. The conveniences of having a covered dock, electricity, and running water made working with a drip system much easier. The injector pump required 120 volts of electricity and the covered dock

protected both the applicator and the equipment. The running water was great for rinsing jugs and flushing lines. The homeowner was willing to monitor the system daily and contact us if problems were detected.

To enable proper placement of the hose in the water for the herbicide delivery system, small concrete anchors (made using teacups, concrete, and coated cloth line wire), and a small float, used to buoy nets, was attached to the end of the hose using a 9-foot length of ¼ inch nylon rope. This allowed the end of the hose to be suspended at middepth in the 16-foot deep river channel.

In order to have a successful treatment and maintain sufficient concentrations of fluridone, Lake Rousseau's flow rates needed to remain near 600 cfs. The treatment began with a flow rate of 554 cfs, with an ending flow of 476 cfs, well below the target level of 600 cfs. Due to the drought, all flow was directed down the bypass spillway to the lower Withlacoochee River. The dam remained closed during the treatment.

After determining the daily amount of herbicide needed, the 30-gallon precision injection

system was setup, calibrated, and locked to the dock. The injector was calibrated to deliver approximately eight gallons per day. On Monday, April 1, 2002, the injector was filled with twenty-one gallons of herbicide. A layer of water approximately ¼ inch in depth was maintained in the injector. This layer remains on top of the herbicide and keeps the herbicide from gumming up. The remaining herbicide was placed in the injector on Wednesdays. The injector was checked and levels noted to ensure that the proper amount of herbicide was being dispensed. Prior to the system running dry, enough water was added to the injector, to allow for flushing over the weekend. Every three to four weeks the ninety-foot injection hose was flushed using a water hose to remove herbicide buildup. To achieve the best success, the treatment was conducted over an eleven-week period and ended on June 14, 2002

Due to the irregular shape of the lake and shifting of the old river channel, additional areas of the lake were treated by boat to keep herbicide concentrations up at lethal levels in all regions of the treatment zone. The two areas

treated by boat were the Old Mill and lower lobe (Fig. 1). The lower lobe extends from the barge canal to the dam. The Old Mill area is directly across from the injector site.

Forty gallons of Sonar A.S. was applied weekly to Lake Rousseau the first four weeks. However, herbicide levels did not meet target levels and a decision was made to increase the weekly output by ten gallons. With the additional ten gallons of Sonar A.S. each week, herbicide concentration levels moved up to what had been predetermined to provide adequate control levels. During the first seven weeks, ten to twelve gallons of herbicide were applied weekly by boat. For the last five weeks, fifteen gallons were dispersed weekly by boat. Additionally, during the last five weeks a new area, the Fin and Feather Fish Camp area, was treated by boat. This area is located on the north shore of the

lake, just west of the Levy county boat ramp. These changes helped to insure for a successful treatment.

Monitoring

Water samples were taken weekly from ten sites to determine herbicide levels, and plant samples were taken from these sites every three weeks to determine if the hydrilla was taking up a lethal dose of fluridone. Fifty growing tips were collected at each site and sent to the lab for analysis. During the latter part of the treatment, finding fifty growing hydrilla tips became difficult! Water and hydrilla samples were also taken in July to determine the approximate date that the herbicide was flushed from the system.

Two areas where hydrilla had been strongly impacted, but was refusing to drop out, required treatment with Aquathol K. This additional treatment ensured these areas did not start to regrow as Sonar levels diminished with flow. This worked well and appeared

to enhance the control in these areas.

Results

In the months following the herbicide treatment, El Nino effects (rainfall) resulted in increased flow of dark tannin-stained water flowing down the Withlacoochee River into Lake Rousseau. This high, dark water coupled with a successfully executed and monitored fluridone treatment has produced results such that a follow up treatment in 2003 is not needed (Figure 5). What made this treatment a success? The primary ingredients for a successful treatment were my crystal ball, a thorough knowledge of the system, closely monitoring important environmental parameters, as well as the considerable assistance provided by Greenways and Trails personnel, SePro staff, Applied Aquatic Management applicators, lake residents, and Mother Nature!

Editor's note: If you have a favorite airboat adventure you'd like to share please contact Judy Ludlow, Aquatics Editor. Airboats are an integral tool of our trade, and demand respect. Many of us have "favorite" stories that, if shared, may educate and enlighten others so that they may avoid the situation you were in, or learn new tricks to get out of a jam!



My Favorite Airboat

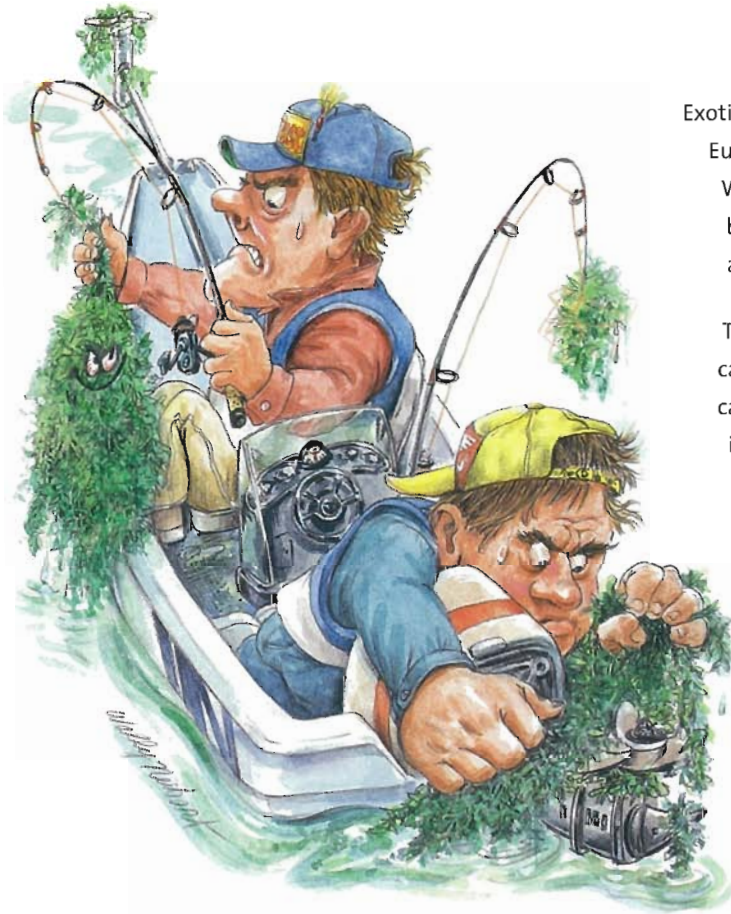
"Story"

The airboat trails in the shallows of Lake Hatchineha, Osceola County, are beautiful indeed. So it is easy to understand how this particular aquatic plant manager kept exploring a trail until its bitter end. No polymer, no winch, no paddle prop, no cell phone, (they weren't even invented yet!) only a 4 cylinder aircraft on a heavy aluminum hull. Stuck! So, to lighten the boat's load in hopes of powering

around, he removed everything he could: cooler, water, notebooks, anchor, lifejackets, paddle, extinguisher, etc. and placed them in the marsh out in front of the boat. Cleverly tying the rudders to port and a pull rope to the throttle, he cranked up the boat and stepped out. Inch by inch the boat turned as he pushed on the side of the bow while pulling the throttle wide open using the rope. One long hour later the boat began

to gain momentum and he jumped back into his seat. The boat finally turned back onto the trail, and now... all the equipment unloaded in front of the boat was behind the boat! But darn if he was gonna stop! With business cards, lifejackets, and notebooks now airborne he kept going and didn't look back. He swears to this day that gators can grin, especially the one enjoying the lunch that fell from the sky!

Too Many Weeds Spoil the Fishing



Exotic invasive aquatic plants such as Hydrilla, Eurasian Watermilfoil, Curlyleaf Pondweed, Water Chestnut and Water Hyacinth can be detrimental to a healthy fishery in lakes across the country.

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ADJUVANTS: PRICE vs. VALUE



Fig. 1

by Kelly Duffie

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You've spent days, if not weeks and sometimes years, educating yourself about various herbicides and treatment options. You want to ensure that your herbicide budget is invested in the safest and most cost-effective treatments possible. Yet when treatment-time arrives, you seek and accept the least expensive available adjuvant to mate with the relatively high-dollar herbicide that was selected.

This frequent occurrence is comparable to buying a Ferrari and equipping it with the cheapest tires that can be found. The capabilities of the high-performance vehicle are compromised even before it hits the road.

The development and marketing of new herbicide- chemistries over the past three decades has greatly overshadowed the important and sometimes vital role that adjuvants play in the performance of modern herbicides. Consequently, many folks are unaware of the criteria associated with a quality adjuvant and how to use these criteria to select the best adjuvant for a given task.

In recent years, many herbicide manufacturers have instituted verbiage on herbicide labels that emphasizes the importance of using quality adjuvants. These herbicide label initiatives were primarily in response to increasing product-per-

formance complaints that resulted from the use of inadequate or less efficacious adjuvants.

Adjuvants are commonly used to affect the physical or chemical properties of a spray mixture. They generally fall within one of the three categories below.

- 1) **ACTIVATOR ADJUVANTS** (which increase the biological-activity of herbicides) include Nonionic Surfactants, Crop Oil Concentrates, Fertilizer Solutions and Methylated Seed Oils.
- 2) **SPRAY MODIFIER ADJUVANTS** (which modify the spray solution) include Spreaders, Stickers and Thickeners.
- 3) **UTILITY MODIFIER ADJUVANTS** (which widen the conditions of herbicide uses) include Antifoaming Agents, Compatibility Agents and Buffering Agents.

Due to space considerations, this article will primarily focus on Activator Adjuvants that are designed for aquatic herbicide applications.

In respect to post-emergence weed control, Activator Adjuvants are employed to enhance herbicide effectiveness through improved leaf surface deposition and increased plant uptake. Activator adjuvants affect the herbicide's ability to penetrate the lipid layer of the leaf surface, thus allowing the herbicide to enter the plant's vascular transport system. The exact manner in which an adjuvant adheres to and penetrates a leaf surface is a func-

tion of the leaf structure and of the chemical and physical nature of the spray solution.

Some plant leaf surfaces are textured, hairless and have easily penetrated cuticles. Such plants generally offer minimal physical resistance to herbicide control efforts.

But other plants, especially those that are frequently found in aquatic sites, often possess leaves with dense pubescence or waxy surfaces (Fig 1). Such characteristics often provide an effective physical defense against topical herbicide treatments. The success of herbicide treatments on these plant species may hinge as much on the selected adjuvant as on the selected herbicide. In such cases, shaving treatment costs by using a less expensive adjuvant may well jeopardize your higher-priced herbicide investment.

The most expensive herbicide treatment is the one that fails to accomplish the purpose for which it was applied. Granted, herbicide failures are fairly rare. However, a more realistic example (using quantitative terms) would arise if one "saves" \$2 an acre by using a lower priced adjuvant, yet forfeits 10% in performance-efficacy on a \$50 per acre herbicide investment (-\$5). The net result is a \$3 per acre investment loss.

So, how may a quality adjuvant be discerned from its inexpensively produced cousins? In some cases, price may be an initial indicator. The old adage, "You get what you pay for" is certainly applicable. However, one can easily pay too much for a marginal or inferior adjuvant. Therefore, it is important

to understand the various criteria for determining an adjuvant's value relative to its cost.

First, never presume that the listed percentage of active-ingredient is indicative of an adjuvant's quality. The EPA does not regulate adjuvants (at least, not yet). Therefore, adjuvant formulators are not required to divulge the exact ratio of components contained within their formulated products. Simply stated: An adjuvant's professed "90% active-ingredient" may mean little more than the fact that it contains 10% water. The actual components that comprise the "90% active-ingredient," and their relative ratios, will determine the adjuvant's true quality and value.

Another ploy that tempts quality assumptions involves an adjuvant's labeled use-rate. Unlike adjuvant formulators, pesticide manufacturers are required to prove and support their labeled use-rates. Unfortunately, adjuvant formulators are generally free to list recommended use-rates that they determine are appropriate. These use-rates may not be in sync with the end-user's goal.

Many adjuvant brands may vary in consistency between production lots. This occurrence is often related to some marketers' practice of securing their products or components from adjuvant producers who are eager to sell "off-spec" material (a product which is unacceptable for the purpose that it was originally produced). Since adjuvants are used in numerous textile and petrochemical industries, off-spec adjuvant-blends are often available at very attractive prices. But, these products are also very inconsistent in their composition. In contrast, quality adjuvants for herbicide applications are ideally produced from 100% virgin ingredients and blended within specific parameters.

Isopropyl alcohol (IPA) is a common and very inexpensive component found within many adjuvants. Relatively high levels of IPA may be indicated when an adjuvant's MSDS reflects a low flash-point (~<120° F).

Although IPA does provide some surface-tension reduction (wetting action), it doesn't necessarily benefit the efficacy of herbicides. In some cases, high IPA levels may actually increase the rate of droplet-evaporation, thereby allowing the herbicide's active-ingredient to crystallize on a treated leaf surface. Plant leaf surfaces can more readily absorb herbicide active-ingredients while the deposition remains in a moist or liquid state.

In some cases IPA may be appropriately added to the adjuvant as a formulation aid at 5% to 10% concentrations. However, IPA concentrations in excess of 10% may simply be a means of reducing product production costs while maintaining a professed amount of "active-ingredient."

Other common adjuvant ingredients are Free Fatty Acids. These components provide some degree of rainfastness, slow the droplet drying time and help prevent runoff of the spray solution. Of these attributes,

prolonging the drying time of the spray-deposition may be the most valuable.

Two of the most useful quantitative characteristics for distinguishing a quality adjuvant from the less effective versions are "Surfactant Loads" and "HLB values."

"Surfactant load" indicates the product's exact content of nonionic surfactant. Not to be confused with the claimed level of "active-ingredient," the surfactant load does not include inert or non-surfactant components (such as IPA, defoamers, buffering agents, etc.). Nonionic surfactant is the primary functioning agent for penetrating a leaf's surface. Since nonionic surfactants are usually employed at high dilution ratios of 800:1 to 200:1 (1-4 pints per 100 gallons), it is vital to use a product with a relatively high surfactant load (preferably 70%).

"HLB Value" is a more technical measure of surfactant quality. Surfactant molecules have two distinct ends. One end (the head) has an

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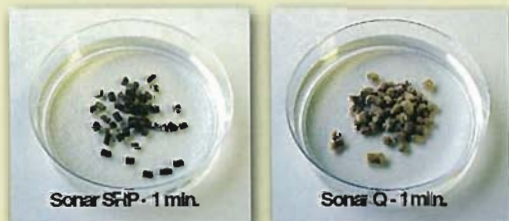
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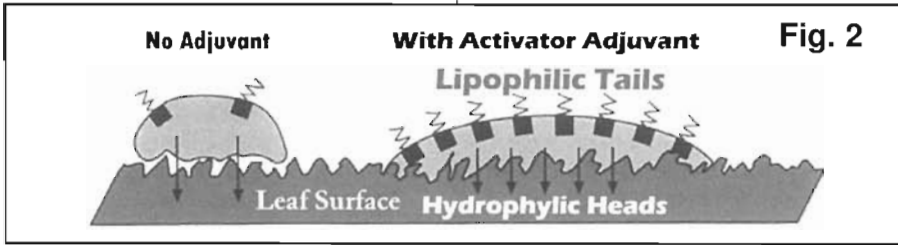
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affinity for water; also known as “hydrophilic.” The other end (the tail) has an affinity for oil; referred to as “lipophilic.” (Fig. 2) The HLB value is a measure of the “Hydrophilic-Lipophilic Balance” of the surfactant. Nonionic surfactants are assigned HLB values that range from 1 to 20. A HLB value of 1 is considered oil-soluble while a HLB value of 20 is water-soluble. In order to provide maximum herbicide efficacy, a quality surfactant should possess a HLB value 13.

A product’s HLB Value is the best guide in determining the surfactant’s ability to improve herbicide performance. Interactions between the surfactant, herbicide and plant

are complex and depend on more than just the physical characteristics of the spray solution to enhance herbicide performance. Generally, as the HLB value of the surfactant increases, so does its benefit to herbicide performance.

One final measure of an adjuvant’s quality involves its “Antifoam Index.” The antifoam index indicates the product’s foaming-fighting characteristics. An antifoam index of “5” means instantaneous foam elimination, “3” means that foam will break down within 10 seconds, and “1” means that the foam will break down within 60 seconds after agitation ceases. A high-foaming adjuvant creates quite a challenge

when it comes time to refill the spray tank. The foam produced by a high-foaming adjuvant will frequently overflow the tank’s opening, often before the tank has been half-filled with water.

Needless to say, a quality adjuvant is not created on the basis of only one of the factors discussed above. A superior adjuvant is a precise blend of all of these factors.

Great effort is frequently invested toward finding better herbicides, use-rates, and application methods. Unfortunately, similar efforts are rarely directed toward the study and evaluation of adjuvants.

Due to the lack of awareness, information and qualitative-criteria, low-priced adjuvants have generally been accepted as being “about the same” as the more expensive formulations. Hopefully, the information presented herein will prove useful when attempting to discover and assign an adjuvant’s true value relative to its price.

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The Development of a Submerged Aquatic Vegetation (SAV) Mapping Program for Lake Okeechobee, Florida

by Mark Brady, SFWMD

Lake Okeechobee is a shallow 740 square mile lake located in south central Florida. It is the second largest lake wholly contained within the contiguous United States, and the largest lake in the southeast. Although the Lake is a natural feature, it is now completely encircled by a levee known as the Herbert Hoover Dike. The Herbert Hoover Dike was constructed, beginning in the 1930's, to provide flood protection to the towns and agricultural fields south of the Lake after flooding caused by the hurricane of 1928 killed thousands of people in the region.

Prior to the construction of the dike the Lake was fed by a sprawling marsh to its northwest and often overflowed its banks to the south

providing sheet flow to the southern Everglades. After impoundment the marsh on the western side of the Lake continued to function as a wet prairie and, with stabilized water levels, a band of submerged vegetation established itself from the north end of the Lake around to its southeast corner. The bathymetry of the east side of the Lake is too steep for any substantial submerged aquatic vegetation (SAV) to thrive, although a small fringe can develop in the northeast corner of the Lake when Lake stage (surface elevation) is low. Submerged vegetation communities start just outside of the emergent marsh, and continue lakeward until reduced light levels caused by depth and/or turbidity limit their ability to colonize further.

The abundance and distribution of SAV in the Lake is of great impor-

tance to fish, wildlife and humans in South Florida. SAV is valuable fish habitat and consequently is a major contributor to the viability of the Lake's multimillion-dollar sports fishing industry. Further, SAV has the ability to stabilize sediments and assimilate large quantities of plant growth nutrients, thereby helping to maintain clear water conditions and prevent the occurrence of nuisance blooms of algae. Maintaining a healthy SAV community in the Lake is of such importance that it has been identified as a key performance measure to judge the effectiveness of mandated regional restoration programs.

Despite the important role that SAV occupies in the ecology of Lake Okeechobee there was little quantitative data describing the spatial extent and temporal changes of the SAV community. Scientists from the South Florida Water Management District (SFWMD) initiated a comprehensive SAV monitoring effort in the spring of 1999. This effort would eventually include a traditional transect based sampling program based on an earlier effort by the University of Florida, as well as an annual lake wide grid survey, of all potential SAV habitat.

Initially a series of transects, first used in an SAV mapping project carried out from 1989 to 1991, were reestablished in the littoral zone of the lake. The transects were located using a Trimble Pro-XR® differential GPS (Global Positioning System) receiver. The coordinates for each sampling site were downloaded from the GPS and used to create a geo-referenced ARC/INFO® point coverage. Data obtained during

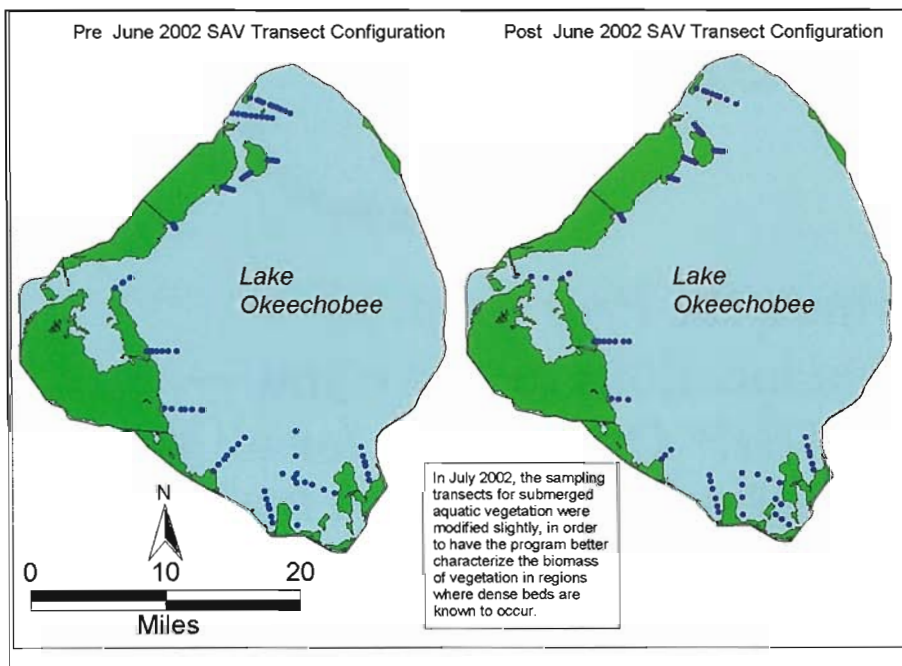


Figure 1. Development of vegetation sampling transects in Lake Okeechobee

sampling events could then be linked to a physical location as an attribute. During sampling events, the GPS was used to navigate back to each of the stations on the transects. At each site water quality samples were taken for physical and chemical analysis and SAV was harvested for identification and biomass determination. The harvesting took place by randomly throwing 3, 0.5m² weighted square plastic frames into the water and having divers collect all the above ground SAV within the frames. As the sampling program developed, changes were made to optimize the sampling method. Instead of using divers to collect the SAV, a tongs-like device was constructed from two standard garden rakes. The rakes are bolted together and the handles are attached to each other by a chain to ensure a consistent opening (Figure 2a, b). As with the previous method, three rake grabs are taken and the collected SAV is taken back to the laboratory for cleaning and above ground biomass determination.

As a result of widely fluctuating Lake levels during the course of the study some of the transects had stations added or removed to facilitate sampling. Finally, in the summer of 2002, a configuration that would be viable during both high and low water extremes and that allowed monitoring of known SAV beds was adopted (Figure 1).



Figure 2a. Custom built submerged vegetation sampling device.



Figure 2b. Collecting submerged vegetation samples in Lake Okeechobee.

Although the transect sampling approach is a good tool for measuring large-scale changes in the SAV community, it has obvious shortcomings, one of which is its inability to characterize the SAV community between transect sampling sites. To

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fill this gap it was decided to conduct a full Lake SAV survey once a year at the height of the growing season. Using ARC/INFO® a grid was constructed with each cell being 0.5km by 0.5km. However, this spatial resolution resulted in over 1700 sampling sites and to make the sampling effort more reasonable, the grid was resized to 1km by 1km after the first year of sampling.

The grid was laid over the boundary of the Lake and cells not contained within the boundary were removed. Removing any cells that existed inside the emergent marsh boundary further refined the grid. The inside boundary was defined by eliminating any grid cells lakeward of the 8-ft. depth contour (Figure 3). This was done because previous transect work indicated that SAV was never present when water depth exceeded about 2m (approximately 6.5 ft). The coordinates from the center points of each grid cell are loaded

into differential GPS units. Sampling teams, using either air boats or outboards, navigate to the center point of each grid cell proceeding from shore towards open water, until no SAV is found in a grid cell in that row or any cell adjacent to that cell. SAV sampling is performed using the same rake device used for the transect sampling, although plants are identified in the field and not collected for biomass determination. SAV species, depth, secchi depth, and an estimate of SAV density are all recorded through a menu driven form on the GPS datalogger. Upon returning from the Lake, the datalogger is downloaded using Trimble's Pathfinder Office GPS processing software. The data is then assembled in a database and, using Arcview3®, a spatial

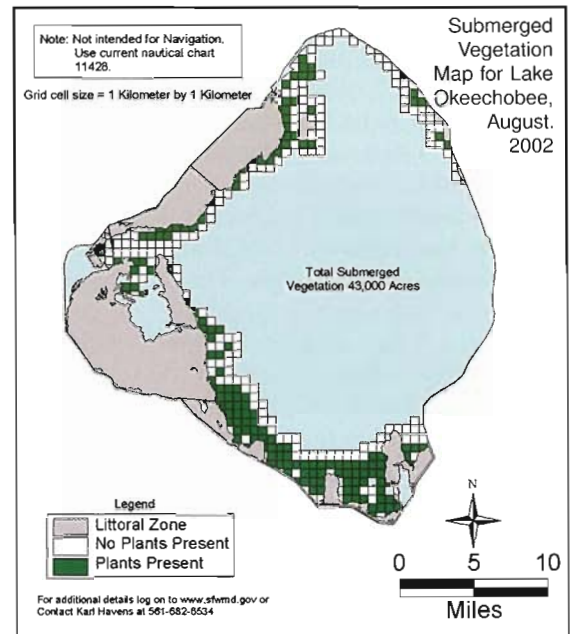


Figure 3. Map of grid sampling scheme developed for full lake SAV surveys.

join is performed between the grid cell center points and the database file. This makes updating the maps automatic because each time the database file is updated, and the

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Arcview3® application restarted, the spatial join is reestablished.

As we move forward in our SAV mapping projects we are always on the lookout for new ideas or ways to make our current products better. One project currently under development makes use of infrared underwater video cameras to identify SAV in the stained and often turbid waters of Lake Okeechobee. We are integrating the infrared cameras with a GPS and pocket type PC running ESRI's ArcPad software. This software allows the PC to display and generate Arcview shapefiles on the fly. Furthermore, these shapefiles' attributes can be manipulated in the field making data collection and map production a single, nearly instantaneous step.

For more information on the research activities of the Lake Okeechobee Division at the South Florida Water Management District, go to our web site at: www.sfwmd.gov/koe_section/2_lakeokee.html

Editorial

Continued from page 3

sumed pickles within 14 days preceding the crash.

... that 63.1% of juvenile delinquents come from homes where pickles are served frequently.

Perhaps you seek evidence of long-term nature:

Of the people born in the year 1839 who later dined on this vegetable, there has been a 100% mortality.

All pickle-eaters born between 1839 and 1873 have wrinkled skin, brittle bones, and failing eyesight.

Even more convincing is the report of a noted team of medical specialists: rats force-fed with 20 pounds of pickles per day for 30 days developed bulging abdomens.

If you are a skeptic, try this experiment: buy 5 quarts of pickles from your neighborhood grocer. (You'll be shocked to learn this dangerous food is actually on sale near your place of worship.) Grind the contents to a pulp and place in a bowl. Drop in one live guppy.

It will die within 4 hours!

If this sounds ridiculous, compare it with the logic that condemned the entire cranberry industry because of the actions of a few growers.

Note: The above article was written in response to the catastrophic effect on the cranberry industry in the late 1950s when some growers misused the herbicide aminotriazole and residues were found in cranberries. The Food and Drug Administration (FDA) withdrew 3-1/2 million pounds of cranberries from the market in 1957. Contaminated berries again were found and withdrawn in 1959. These highly publicized incidents initiated a debate between the chemical industry and the FDA when the FDA declared aminotriazole to be a carcinogen based on testing and standards that many in the chemical industry disagreed with, and a zero tolerance level for residues was required under the Delaney Clause.

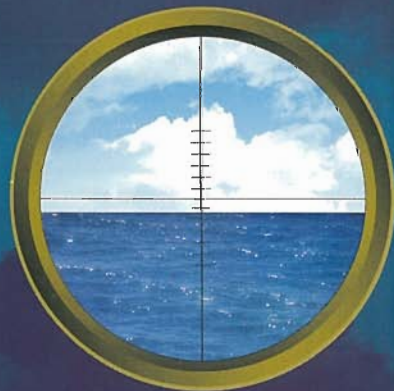
For further reading, see:

DuShane, G. (1959). Cranberry Smash. *Science* 130(3387):1447.

Anon. (1959). Cranberry Crisis. *J. Agricultural and Food Chemistry* 7(2): 807-808.

Submitted by Karen Brown, University of Florida, Center for Aquatic and Invasive Plants, kpb@mail.ifas.ufl.edu, February 2002

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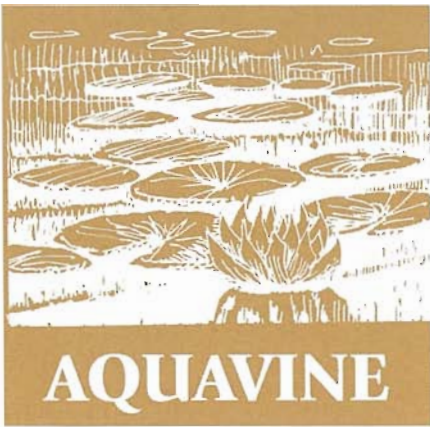
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Florida Aquatic Plant Management Society Annual Conference, October 13-16, 2003 Adam's Mark Hotel, Daytona Beach, FL. Contact Bill Torres, 850-245-2809 or William.torres@dep.state.fl.us for more information.

North American Lake Management Society 2003 Annual Conference: "Protecting Our Lakes' Legacy," November 5-8, 2003 Mashantucket, Connecticut. Contact Terry Thiessen, 608-233-2836, thiessen@nalms.org for more information.

APIRS Update!

The Aquatic, Wetland, and Invasive Plant Information Retrieval System (APIRS) now is in a much more user-friendly format, thanks to major support from the Florida Department of Environmental Protection-Bureau of Invasive Plant Management, and the US Army Corps of Engineers- Aquatic Plant Control Research Program (Jacksonville District and Vicksburg, MS). Please check it out at: <http://plants.ifas.ufl.edu/search80/NetAns2/>

In addition to our 20-year history of collecting the world-wide literature on aquatic and wetland plant species, for the past couple of years we have been collecting the new and retrospective literature on upland invasive species here in Florida, as

well as the more general literature on invasive species problems worldwide. The annotated citations to this literature can be easily found by searching the database. Just a few examples of the numbers of references on invasive species here in Florida: we now have approximately 120 references on *Dioscorea alata* and *D. bulbifera*; over 100 on *Psidium*; over 40 on *Paederia*; 80 on *Albizia*; 70 on *Acacia auriculiformis*; 50 on *Ardisia crenata* and *A. elliptica*; 367 on *Colocasia esculenta* (an aquatic, so we had a head start), over 80 on *Ligustrum*; almost 150 on *Lonicera*. This is just a small sample — search for your favorite (or least favorite) species yourself or contact me for help. Remember that many of these references won't be specifically about one species, but may be review articles or floristic surveys. There also will be overlap between species.

Please remember to send your reprints and reports to APIRS for inclusion in the database, which now is just a few citations shy of

60,000 records. Thanks - and please let me know if I can be of any help.

Karen Brown
University of Florida - Center for Aquatic and Invasive Plants
Aquatic, Wetland and Invasive Plant Information Retrieval System (APIRS)
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