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A New Image for the Water Hyacinth

In tropical and subtropical areas where water hyacinths grow, including the southern United States, these aquatic plants are generally considered a colossal nuisance. They are extra-ordinarily prolific, virtually indestructible, and their rapid growth clogs rivers and streams.

However, in a small but growing number of American communities, the glossy green, violet-flowered water hyacinth is developing a new image as a useful and beneficial plant. Its upgraded status stemmed from the discovery – in a NASA technology application project – that water hyacinths thrive on sewage; they absorb and digest wastewater pollutants, converting sewage effluents to relatively clean water. Thus, the plants have exciting promise as a natural water purification system, which can be established at a fraction of the cost of a conventional sewage treatment facility. Water hyacinths are serving that purpose in several locales and a number of other communities are considering adoption of the technique.

For maximum effectiveness, pollution-gorged water hyacinths must be harvested at intervals, but this apparent drawback offers potential for additional benefit. Harvested plants can be– and are being – used as fertilizer. They can also be heat-treated to produce consumer energy in the form of methane gas. And if an economical way of drying the plants can be developed, they may find further utility as high-protein animal feed.

NASA launched its initial water hyacinth experiment in 1975 at John C. Stennis Space Center (SSC) formerly the National Space Technology Laboratories (NSTL), Bay St. Louis, Mississippi. With the cooperation of Bay St. Louis officials, NSTL

Fenced off seven acres of the city's 40-acre sewage lagoon and planted water hyacinths. The plants flourished on the sewage and the once-noxious test area became a clean aquatic flower garden.

On the basis of this and other experiments, SSC described the method and results in a study report which has been widely used as a basis for further application of water hyacinth technology. One of the earliest users was the town of Rio Hondo, Texas, population 2,000. Seeking alternatives to construction of a costly conventional sewage facility, town Mayor Juanita Brodeky learned of NASA's work, contacted SSC and obtained literature and personal guidance. Rio Hondo decided to adopt the NASA system, dug lagoons and imported water hyacinths. For more than four years, the plants have proved an effective, year-round means of treating sewage. The initial cost of the facility came to only one-twentieth the quoted estimate for a conventional system.

Similarly, the community of Orange Grove, Mississippi, shelved plans for an expensive mechanical system and opted instead for a combination of wastewater treatment methods in which water hyacinths play a leading role. In Florida, the Coral Springs Improvement district used SSC's research as the basis for a 150,000 gallon-a-day water hyacinth pilot plant which has been operating since 1978; installation costs were 40-70 percent below those of a conventional system and ongoing costs run 25 percent less. The city of Lucedale, Mississippi plans a program, which will include water hyacinth treatment of sewage together with methane generation from harvested plants.

Walt Disney World, Lake Buena Vista, Florida, activated a prototype 100,000-gallon-a-day sewage treatment plant using SSC's water hyacinth technology. The plant is part of the Experimental Prototype Community of Tomorrow (EPCOT), being created to provide a site for demonstration of new technological, social and aritistic concepts. Among the sponsoring organizations of this project-along with the Environmental Protection Agency, the Department of Energy, NASA and private companies is the state of Florida, which is studying the possibility of using water hyacinth technology on a statewide scale. Florida has a need for improvement of its rural sewage treatment procedures, and it is estimated that water hyacinth systems could halve the $330 million cost projected for upgrading the state's sewage facilities by conventional means.

The city of Hercules, Georgia, has built a 350,000-gallon-per-day water hyacinth wastewater treatment plant. The unique facility has a greenhouse cover, which permits year-round operation. It can be expanded to treat almost two million gallons of raw sewage wastewater daily.

The largest application of water hyacinths yet initiated is a million-gallon-a-day pilot plant recently approved for the San Diego (California) Water Utilities Department (SDWUD), which handles sewage treatment for more than two million area residents. SDWUD contemplates a recycling system in which water hyacinths, combined with a mechanical system for separating solid waste, will restore wastewater to a certain level of purity; further treatment by other means would make the water pure enough for drinking and general use. Interested in broader application of water hyacinth technology, the California Water Resources Control Board has established an Aquaculture Studies Section to investigate the matter.

A number of other state and local governments are looking into water hyacinth sewage treatment and there are also several experiments under way to explore the plant's byproduct potential as a source of methane gas or animal feed. For example, United Gas Pipe Line Company is one of the sponsors of the Disney World EPCOT program; in addition to its EPCOT study of separating methane from heat-treated water hyacinths, the company has been considering construction of a pilot plant in Louisiana to investigate large-scale production of methane from a combination of water hyacinths. Bermuda grass and municipal sewage.

Using harvested water hyacinths as animal feed was researched by the Louisiana State University Agricultural Experiment Station. In one test, conducted with SSC cooperation, researchers fed chopped, solar-dried water hyacinths to a herd of dairy cows for four weeks; it was found that the cows produced as much milk-and of comparable qualify-as did cows fed their customary hay ration. LSU dairy scientists feel that the plants could become an alternative livestock feed when land now used to grow forage may have to be used to produce food for humans.

Additional research is needed before water hyacinths become practical, economical sources of methane or animal feed, but the plants have already demonstrated their efficacy in sewage treatment and wider application for that purpose seems likely.

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