



Giant reed, which has shown the greatest biomass production potential for floating platforms on wastewater lagoons, is examined by technician Bobby Shiver (left) and soil scientist Robert Hubbard just before harvesting.

## Floating Above Lagoon Wastewater

Lagoons are commonly used to store wastewater from confined-feeding operations for dairy and swine. The wastewater is generally applied to land as fertilizer. But if the waste is not applied properly, excess nitrogen and phosphorus from it may eventually contaminate drinking water, impair soil quality, and cause dead zones in surface waters.

Agricultural Research Service scientists are studying a way of using those excess nutrients. The basic concept is to grow vegetation on special mats placed on the lagoons. The vegetation can then be harvested and composted and used as a soil amendment. If grass is grown, it can be removed intact and transplanted as sod.

Soil scientist Robert Hubbard, in the Southeast Watershed Research Unit at Tifton, Georgia; plant pathologist Jeffrey Wilson and geneticist William Anderson in the Crop Genetics and Breeding Research Unit at Tifton; and their colleagues Larry Newton, John Ruter, and Gary Gascho at the University of Georgia conducted studies to determine whether the idea is feasible. They also measured the amount of biomass and nutrients that could be removed in about 1 year.

One research phase has been completed, and the second is in process. The first phase was conducted in small tanks using treatments of full-strength wastewater, half-strength wastewater, or an inorganic solution. Vegetation was grown on floating rafts constructed of PVC pipe and chicken wire and covered with jute erosion-control matting.

The second phase is being conducted at Southern Select Farms, a commercial hog farm with an anaerobic lagoon of very poor water quality, and more plant species are being tested. A new floating mat, made of plastic foam covered with braided coir—the

coarse fibers from the outer shell of coconuts—was designed in cooperation with Maryland and Charleston Aquatic Nurseries.

“Several different plant species have emerged as possible candidates for broad use, including coastal bermudagrass and St. Augustine grass—both of which can be cut intact and laid as sod—and giant reed, which has potential as a source of biodiesel fuel,” says Hubbard.

In the first phase, floating rafts were sprigged with cattail, rush, or maidencane. “Cattail grew best on full-strength wastewater, produced the most biomass, and removed the most nutrients,” says Hubbard—an average of 15,240 grams of dry biomass per square meter per year. Harvesting the cattail removed averages of 493 grams of nitrogen and 73 grams of phosphorus per square meter per year.

Hubbard plans to try vegetated rafts to remove nutrients from fishery and citrus greenhouse operation wastewater and in Florida canals. “Canals in Florida have high phosphorus and nitrogen levels from farm field runoff. Use of floating vegetated rafts on small canals or along the edges of larger ones may prove quite helpful in removing those nutrients and improving water quality,” says Hubbard.

Although not yet evaluated, the method also has potential for reducing odor problems associated with lagoons.—By **Sharon Durham, ARS.**

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PEGGY GREB (D555-1)



Floating platforms of various vegetative mats in an anaerobic swine wastewater lagoon. The plant species grew rapidly and include pennywort, coastal bermudagrass, common bermudagrass, and giant reed.