

# New technology could set shrimp production record

**N**EW shrimp production technology developed by a Texas AgriLife Research scientist near Corpus Christi, Texas, may revolutionize how shrimp are produced.

The patent-pending technology, known as super-intensive stacked raceways, was created by Dr. Addison Lawrence at the Texas AgriLife Research Mariculture Laboratory in Port Aransas, Texas, who said the system is able to produce record-setting amounts of shrimp.

"We're able to produce jumbo-sized shrimp, each weighing 1.1 oz., known as U15 shrimp, which gives us world record production of up to 25 kg of shrimp per cubic meter of water using either zero wa-

## Key Points

- Super-intensive stacked raceways produce jumbo shrimp.
- System can produce 1m lb. of shrimp per two acres.
- First commercial application to break ground.

ter exchange and/or recirculating water," he said.

At this rate of production, Lawrence said commercial shrimp producers will have the potential to increase their profit margins.

A worldwide license for the new technology has been awarded to Royal Caridea. Sublicenses are being con-

sidered for other countries, including Ecuador, Chile, Colombia, Mexico, Canada, China, Germany, the Czech Republic and Russia.

Lawrence said he believes the indoor system will decrease U.S. dependence on foreign shrimp and could even help alleviate world hunger.

"Order a plate of shrimp at any U.S. restaurant, even along the coast, and chances are that you'll be served shrimp (that was) farmed in Southeast Asia and frozen two to four times before it got to your table," Lawrence said. "That's because the U.S. imports about 90% of the shrimp it consumes, with a value of about \$4 billion annually."

A prototype of the new sys-



**STACKED SHRIMP:** Dr. Addison Lawrence (left) points out the lower section of his super-intensive stacked raceway shrimp production system to Dr. Maurice Kemp, president of Royal Caridea.

tem has been constructed in a darkened room. The shrimp grow in four columns of raceways stacked four high. These raceways are long tubs with circulating water at an average depth of 5-7 in. As the shrimp develop, they are transferred to a lower raceway. Baby shrimp are added to the top raceway, while the more mature shrimp in the lower raceways are harvested.

"Simplicity is the key here," Lawrence said. "Some of history's most creative, innovative inventions are based on very simple logic. Keep it simple."

The results of these simple tanks as far as the amount of shrimp that can be harvested are astounding, Lawrence said.

"These tanks require stringent control, supervision and monitoring with computers tracking the shrimp," he said. "Properly run, these systems can produce up to 1 million lb. of shrimp per acre of water, or two acres of land per year," he said. "That's far superior to traditional shrimp farms in the U.S. that can produce only up to 20,000 lb. of shrimp per acre of water per year. In tropical countries that have year-round growing seasons, they can produce up to 60,000

lb. of shrimp per year."

Lawrence said development of the stacked raceway system is the culmination of his 50-year career in aquaculture. Along the way, he has developed various components of the new system, including the patent-pending feed for growing the shrimp, the closed water system using zero exchange and/or recirculation, a unique raceway bottom design, aeration system and other technologies.

He said he envisions stacked raceway facilities near major metropolitan areas throughout the country, producing live, fresh, never-frozen or fresh-frozen shrimp that would be available every day of the year.

The world's first commercial application of Lawrence's stacked raceways will break ground just miles from Port Aransas, according to Royal Caridea president Dr. Maurice Kemp. His company will own and operate the project.

"We'll construct a facility of about 70,000 sq. ft., hire 15-20 people — some of them with advanced degrees — and produce shrimp year-round. We expect to produce some 835,000 lb. of shrimp per year," he said. ■

## biofuels BUZZ

### Waste-to-ethanol process tested

Alter NRG Corp. said it has successfully completed testing of the waste-to-ethanol process at its Westinghouse Plasma Demonstration Center in Madison, Pa. Alter NRG said it believes the technology is a growth market and is working with several biofuel producers to jointly model waste-to-biofuel solutions. It said facilities that convert waste instead of biomass into biofuels benefit from getting paid to safely dispose of waste instead of paying to procure biomass.

Flex Ethanol, a partnership among Australian companies GM Holden, Caltex and Phoenix Energy, recently completed testing with Alter NRG and Coskata Inc. waste feedstocks (including simulated municipal solid waste, sewage sludge and tires), which were successfully gasified by Alter NRG into clean "syngas." That syngas was then converted into ethanol by Coskata. This test represented an important step toward a planned waste-to-ethanol project in Australia that, if constructed, is expected to utilize two of Alter NRG's large-scale Westinghouse Plasma gasifiers.

### Eucalyptus biofuels

FuturaGene, which works to enhance the yield and sustainability of woody crops for the plantation forestry, biopower and biofuel markets, announced that it has entered into a collaborative development agreement with the Guangxi Academy of Sciences (GXAS),

a Chinese government research entity focused mainly on bioenergy research and development of non-food crops.

FuturaGene and GXAS will work together on the development and optimization of second-generation biofuel production from woody species, especially eucalyptus. FuturaGene will supply raw feedstock from eucalyptus species that have been selected for optimal growth in the Guangxi region of China. These species will undergo classic breeding and genetic enhancement to improve yield and stress tolerance.

GXAS will develop analysis methodologies for the early selection of tree species suited for biofuel production and optimized industrial processes for converting wood-based raw material into biofuels.

FuturaGene and GXAS will have the option to jointly commercialize the outcome from matching tree species and developing industrial process.

### DDGS exports

U.S. exports of dried distillers grains with solubles (DDGS) are expected to rise 2.5% this season after shrinking 11% in the first half of 2011 from the same period in 2010, according to the Agriculture Marketing Resource Center. U.S. shipments of DDGS are likely to grow 4.6% to 9.2 million metric tons by the end of August 2013, up from 8.9 mmt by the end of August 2012.

### Algenol biorefinery

Algenol Biofuels Inc. announced that it has broken ground on its pilot-scale integrated biorefinery in Lee County, Fla. This production facility will be the first large-scale deployment of Algenol's

patented Direct-To-Ethanol technology, which produces ethanol directly from carbon dioxide, sunlight and saltwater using blue-green algae in photobioreactors.

The 36-acre facility will contain 3,000 photobioreactors in a commercial module, Algenol's advanced Vapor Compression Steam Stripper ethanol concentration technology and new membrane-based ethanol dehydration technology. The plant will have a target capacity of 100,000 gal. of fuel-grade ethanol per year.

In addition, Algenol said its joint development program with The Dow Chemical Co. has come to an end, and the focus of the relationship will shift to purchasing specialty plastics and films developed during the program for use in Algenol's photobioreactors for the Lee County biorefinery.

### Butanol alliance

Cobalt Technologies announced an agreement for a strategic alliance to develop bio-n-butanol refineries throughout Latin America.

Under terms of the alliance, Cobalt and Rhodia will work together to deploy Cobalt's technology for converting sugarcane bagasse into bio-n-butanol for the chemical and fuel market, initially at a sugar mill. Following this first step, the partners will jointly develop a demonstration plant in Brazil, and they intend to construct multiple biorefineries co-located with sugar mills first in Brazil and then in other Latin American countries.

"This relationship establishes a clear path to commercialization for our technology," Cobalt chief executive officer Rick Wilson said.

## Nutreco buys Chinese fish feed company

**NUTRECO announced that it has successfully completed the acquisition of 100% of the shares in Zhuhai Shihai Feed Co. Ltd. (Shihai), a fish and shrimp feed company in China.**

Nutreco said this acquisition provides Skretting — the Nutreco fish feed business — with a production base in China, the world's number-one aquaculture feed market. The acquisition is fully in line with Nutreco's strategy to capitalize on its fish feed position by expanding

in new regions and into feed for other species, according to the announcement.

The acquisition was announced Feb. 14 and was subject to the approval of Chinese authorities, who have now granted their permission.

Shihai produced approximately 100,000 metric tons of fish and shrimp feed in 2010, the same year it commissioned a new feed plant with a capacity of approximately 150,000 mt. Shihai has about 300 employees. ■