

# New shrimp technologies revealed at field day: Methods could revive Texas, US shrimp industries

To most in the US aquaculture community, Dr. Addison Lawrence's name is synonymous with years of first-rate shrimp culture research and a knack for innovative thinking. Lawrence's work, and that of his colleague Dr. Tzachi Samocha, were showcased at an open-to-the-public field day last fall, hosted by Texas A&M University's Texas AgriLife Research and Extension Center. The report that follows is reprinted by permission of *AgriLife Today*. It is also worth noting that not long after this report was published, Dr. Lawrence's work was again featured in an article in *The New York Times*, headlined "In the School of Innovation, Less is Often More." -Editor.

by Rod Santa Ana

CORPUS CHRISTI - The Texas AgriLife Research and Extension Center here hosted a shrimp production technology field day last fall at two Gulf Coast locations, showcasing new shrimp technologies that could revive the food- and bait-shrimp industries both in Texas and across the US.

A morning session at the Texas AgriLife Research Mariculture Laboratory at Flour Bluff was conducted by project leader Dr. Tzachi Samocha, followed by an afternoon session at the mariculture lab at Port Aransas where Dr. Addison Lawrence reviewed several projects, including his innovative super-intensive stacked raceway production system.



*Texas gold? Domestically reared shrimp could potentially tap into the lucrative US market for shrimp, now being primarily served by imported product - to the tune of roughly \$4 billion annually.*

Patty Waits Beasley photo

## Flour Bluff highlights

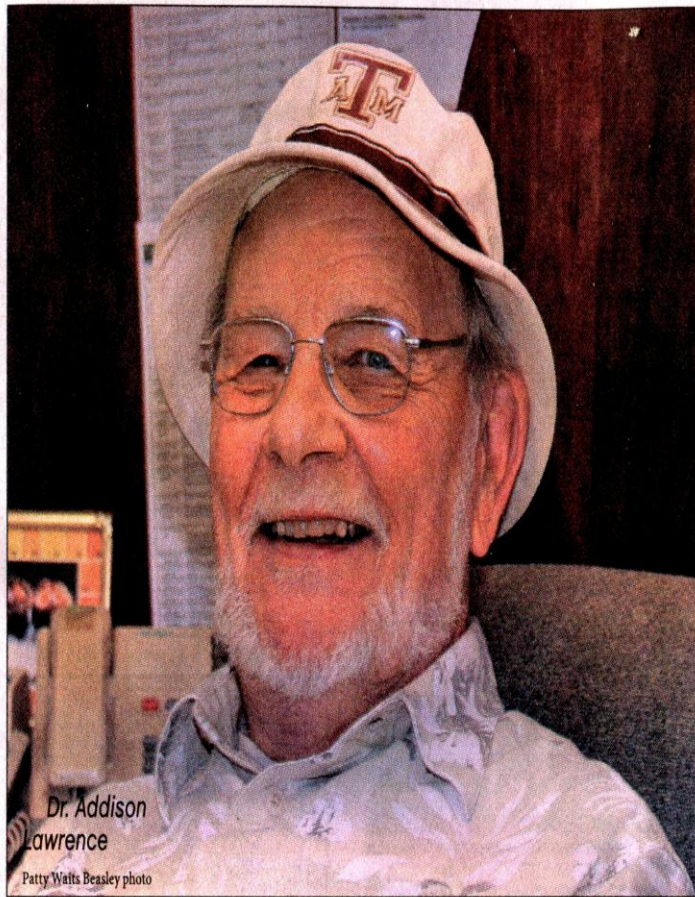
Topics covered by Samocha in the morning session included:

- The culture of microalgae for the production of biofuels and bio-products;
- The development of a live-bait shrimp farming industry;
- Shrimp diets with reduced levels of fishmeal and fish oil;
- The culture of halophytes using nutrient-rich effluent water from fish tanks for human and animal consumption; and
- Samocha's development of super-intensive systems for the production of food shrimp with no water exchange.

"Among the many things we have to resolve and understand in developing a zero-exchange, super-intensive raceway system is getting a better grasp and control of the changes in the culture medium and its effect on shrimp performance, because this is a closed system," Samocha said.

"We're using the same water over and over again, only adding fresh water to compensate for evaporation and the small amounts of water lost in the process to control bacteria." Bacteria is grown in the same water where the shrimp is growing to consume metabolites excreted by the shrimp, creating a bacterial biomass that can

serve as supplemental feed for the shrimp, he said.



Dr. Addison Lawrence  
Patty Waits Beasley photo

serve as supplemental feed for the shrimp, he said.

"Our research here is designed to produce fresh or live shrimp for a niche market with minimal negative environmental impacts.

"To make these systems more cost-effective, we're constantly evaluating different methods to reduce operating costs," Samocha continued.

The results from one study in five 10,000-gallon (40 cubic meters) raceways, or tubs where shrimp are grown, that ended shortly after the field day showed high yields of up to 9.87 kilograms of shrimp per cubic meter of water and rapid growth of 1.95 grams per week.

Production from four other tanks varied between 9.4 and 9.7 kilograms, Samocha said.

## Lawrence's cutting-edge work

Moving on to Port Aransas for the afternoon session, project leader Dr. Lawrence reviewed several projects, including:

- Super-intensive stacked raceway production;
- Feed development and management; and
- Alternative feeds for fishmeal and fish oil replacement.

Other research Lawrence addressed included:

- Partial harvesting;
- Feed additives for antibiotic replacement and improved production in shrimp; and
- Sea urchin farming with probiotics, prebiotics, acidifiers, and essential oils.

The Port Aransas lab has over 900 tanks and 16 raceways with

13 recirculating systems, Lawrence said.

"We provided visitors with a tour of the world's largest shrimp and sea urchin feed and nutrition laboratory.

"We emphasized the major objectives of this laboratory in what we call, 'Shrimp Production Technologies, The New Frontiers.'"

Interest was so great that Lawrence and Jack Crockett, a research associate, discussed the new technologies with visitors until 8 pm, although the official tour ended at 4 pm.

"This innovative new technology, the development of a super-intensive stacked raceway system for commercial shrimp production, is the result of my 50 years of research on shrimp and marine invertebrates," Lawrence said.

"This system is different and better than existing technology," Lawrence said.

"It is based on a new and unique raceway system design using shallow water of less than 20 centimeters, or about 8 inches.

"A patent is pending for both the system and the new feeds, resulting in the greatest reported production in the world of up to one million pounds of shrimp per acre of footprint water, or two acres of land."

Production levels are based upon maintaining constant ideal production conditions that can satisfy organic requirements under stringent biosecure procedures, with no major risk of disease, Lawrence said.

"These production conditions can use zero, reduced, recirculating, and/or flow-through water systems, depending on site requirements," he continued.

"Also of significance is that this production system is environmentally friendly and can be placed near every major metropolitan area in the US, providing a supply of live, fresh-dead or fresh-frozen shrimp from very large (which is referred to as the U15 count), to 26 to 30 count, with each shrimp weighing 1.1 ounces to .5 ounces, respectively, every day of the year."

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# Texas shrimp —

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## A great showcase

Dr. Juan Landivar, center director, said the field day provided an excellent opportunity to present new shrimp technologies that are many years in the making.

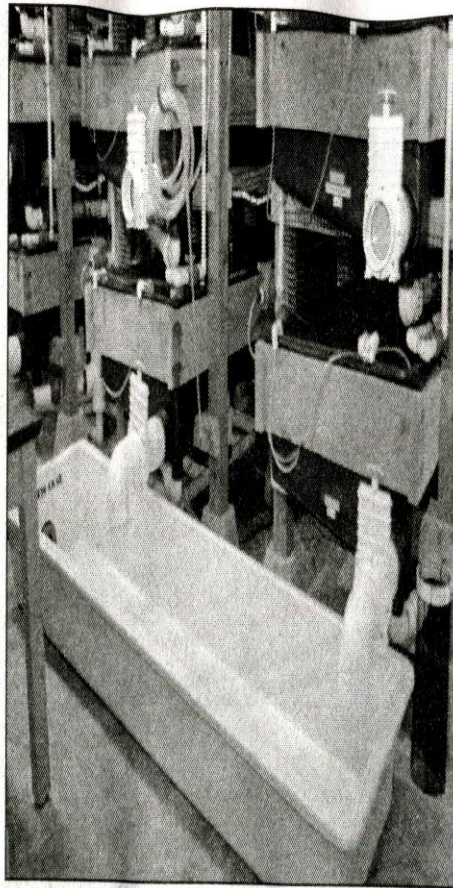
“The work of Dr. Samocha and Dr. Lawrence represents extraordinary progress in our efforts to develop new technologies to revive the food- and bait-shrimp industries in Texas and the US,” he said.

Competition from foreign imports and limited domestic shrimping has resulted in US shrimp imports of approximately \$4 billion annually, about 90% of what is consumed, Landivar said.

“We are at maximum sustained yield, meaning we cannot catch any more shrimp, and we haven’t been able to produce more than one shrimp crop annually using traditional methods,” he said.

“So, the answer is to develop new technologies to grow shrimp bigger, faster and stronger in indoor facilities, year-round to help make us competitive.”

For additional information, contact Samocha at Flour Bluff at (361) 937-2268 or (361) 728-3560; or e-mail <tsamocha@ag.tamu.edu>.

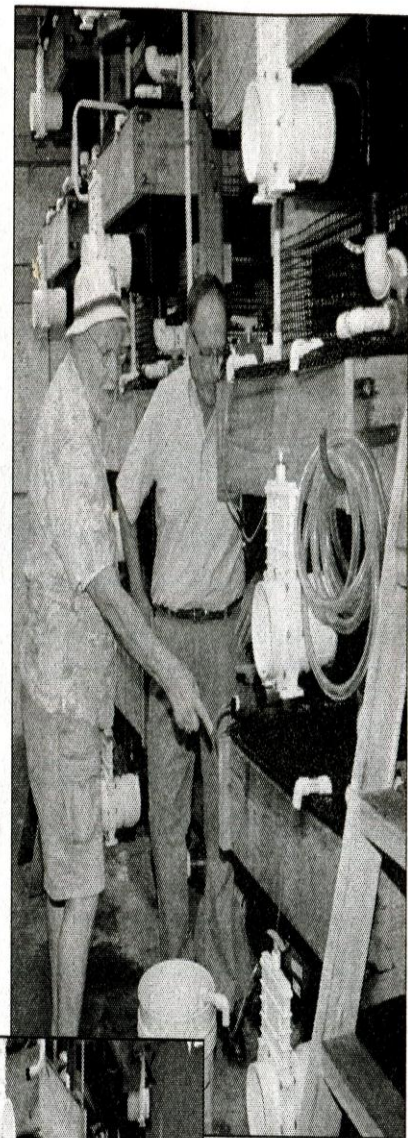


*A look at the stacked raceway system with a harvest tank in place.*

*Patty Waits Beasley photo*

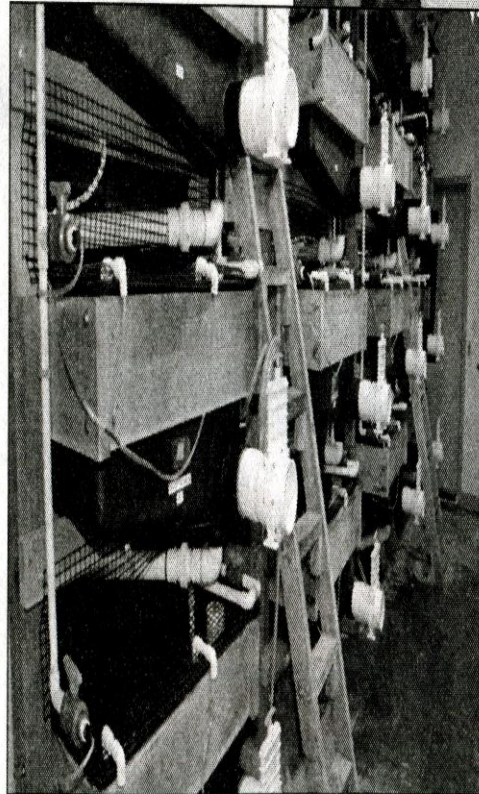
*Dr. Addison Lawrence, left, and Dr. Maurice Kemp, president of Royal Caridea LLC, which holds the license to produce and market the stacked raceway system.*

*Patty Waits Beasley photo*



At Port Aransas, contact Lawrence at (361) 749-4625, ext. 223 or (361) 443-6921; or e-mail <smpall@yahoo.com>. Also, Patty Beasley at (361) 749-4625, ext. 221; or e-mail <smppwb@yahoo.com>.

*Rod Santa Ana is a native of McAllen, TX where he resides with his wife. He has been a communications specialist with the Texas A&M University system since 1988. Prior to joining Texas A&M, he worked in broadcast news throughout South Texas, including several years as a TV news director and anchor at the NBC affiliate in Laredo, KGNS-TV. He can be reached at <r-santaana@tamu.edu>.*



*A view of the stacked raceway system in full production.*

*Patty Waits Beasley photo*