

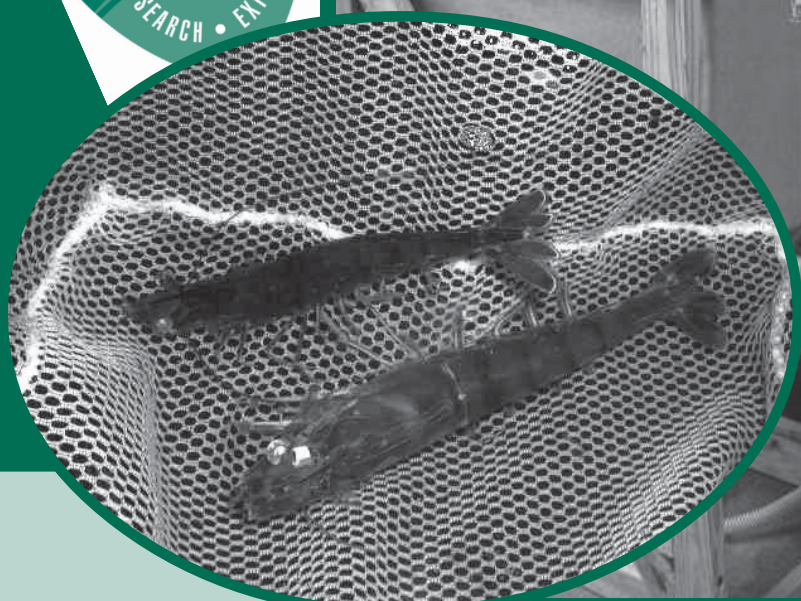
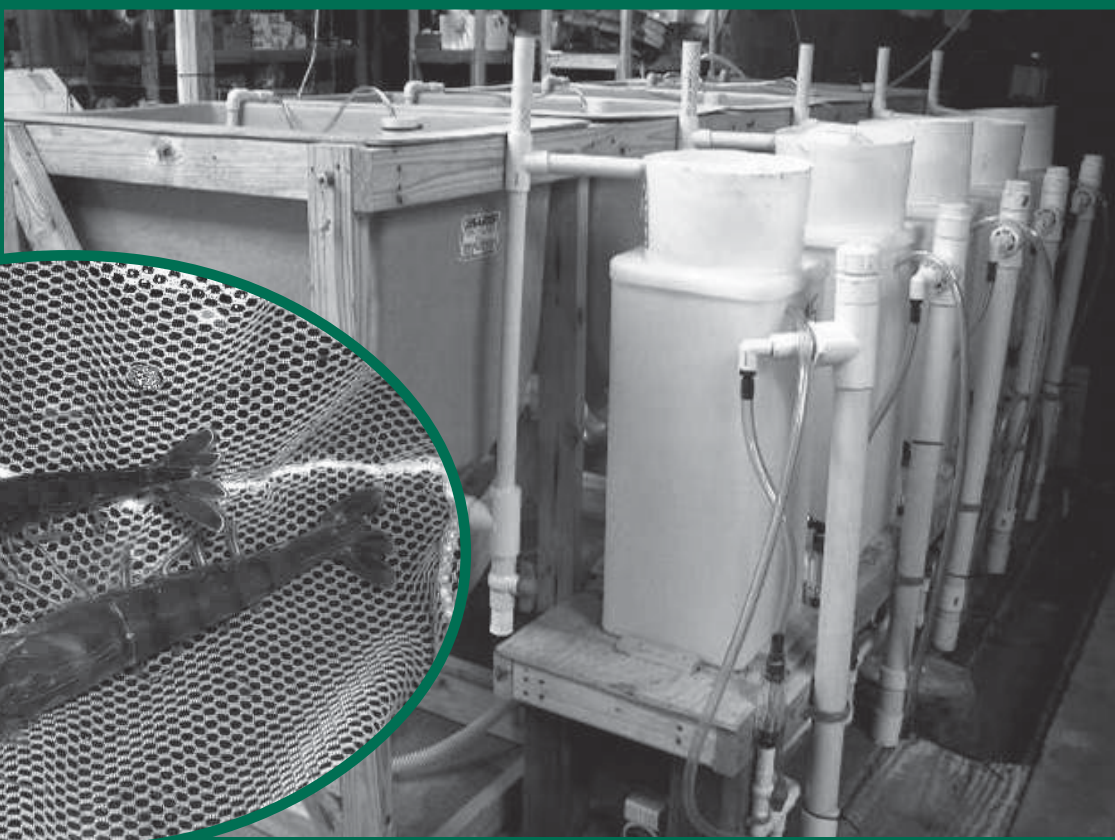


INDUSTRY BRIEFS

THE U.S. MARINE SHRIMP FARMING PROGRAM

October 2004
Vol. 10 No. 4

The U.S. Marine Shrimp Farming Program is a congressional initiative administered by the USDA/CSREES. It is an integral part of their aquaculture development effort and is executed by the U.S. Marine Shrimp Farming Consortium.



Current Status of Bait Shrimp Research at the Texas Agricultural Experiment Station-Shrimp Mariculture Research Facility, Corpus Christi, TX

By Ryan L. Gandy* and Tzachi M. Samocha. In 1995, in response to increasing commercial interest, researchers at the TAES-SMRF in Corpus Christi, Texas, undertook studies to evaluate various aspects of bait shrimp culture. Shrimp endemic to the Gulf of Mexico and southeast Atlantic coasts (*Farfantepenaeus aztecus*, *Litopenaeus setiferus*, and *Farfantepenaeus duorarum*) were evaluated to determine their suitability for the bait shrimp market. Early studies focused on the intensive raceway and pond production of *L. setiferus* and *F. duorarum* to bait shrimp size (5.5 g).

During this period standard production management used direct stocking of postlarvae (PL) and high volumes of water exchange in both raceway and pond culture during the grow-out phase. These studies resulted in raceway production of *L. setiferus* which achieved bait-size (5.7 g) in 99 d with a survival rate of 91% and yield of 2.2 kg/m². Ponds stocked at the same time with this species produced 5.9 g shrimp in 94 d with a survival rate of 45% and yield of 0.57 kg/m². Raceway studies with *F. duorarum* resulted in production of 5.9 g size shrimp in 114 d with a survival rate of 29% and a biomass load of only 0.57 kg/m². Part of the work with *L. setiferus* was facilitated by the availability of PL produced by commercial hatcheries in Texas in an effort to identify a Tauras syndrome virus resistant species.

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January 17-20, 2005
Marriott New Orleans
New Orleans, Louisiana
USA

Aquaculture America 2005 will have presentations of great interest to domestic marine shrimp farmers. A special session will highlight the USMSFP collaborative efforts with recent TSV and WSSV outbreaks and provide updates on the development of superintensive production systems.

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The US Marine Shrimp Farming Program is a congressional initiative administered by the USDA/CSREES. It is an integral part of their aquaculture development effort and is executed by the US Marine Shrimp Farming Consortium:

- The Oceanic Institute**
Waimanalo, HI
- Gulf Coast Research Laboratory**
University of Southern Mississippi
Ocean Springs, MS
- Tufts University**
School of Veterinary Medicine
North Grafton, MA
- Waddell Mariculture Center**
Department of Natural Resources
Bluffton, SC
- Texas Agricultural Experiment Station**
Texas A&M University
Port Aransas, TX
- University of Arizona**
Department of Veterinary Science
Tucson, AZ
- Nicholls State University**
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INDUSTRY BRIEFS

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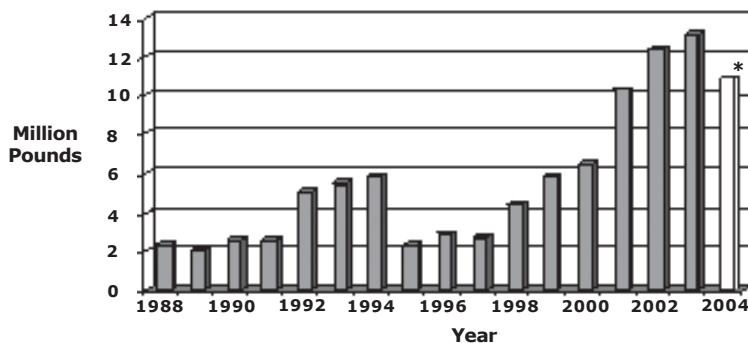
Issues and Priorities

The 2004 season has shaped up to be one of the most challenging for our domestic shrimp farming industry. In addition to low shrimp prices and marketing efforts brought about by the anti-dumping suit that have biased the domestic wild catch, farmers have been faced with rising costs, increasing competition in the broodstock sector, and disease outbreaks in Texas (TSV) and Hawaii (WSSV). Across the country, farmers have em-

ployed various strategies to remain viable including both pond over- and under-stocking and varying management strategies, direct or organic product marketing, broodstock differentiation and expansion into new species, and innovative contract agreements. Some farms made the decision early on to not stock this season and venture into finfish culture or remain dry until prices rebound. And on top of all this, *L. vannamei* are still entering the country in the numbers and sizes that have very much diluted a competitive advantage once held by domestic shrimp farmers. It has been tough; yet despite the overwhelming tone, the estimate for production nationwide is only about 15-20% lower than last year's record 13.1 million pounds. That is a positive testament to the tenacity of U.S. farmers and the future of our domestic industry.

In this issue of *Industry Briefs* we feature some of the issues and priorities that have been expressed by the industry. As I travelled across the country this year and met with farmers, there was an expression of appreciation for the ongoing USMSFP efforts, but also a sense of urgency for the program to provide industry alternatives to weather the existing economic storm of low prices. A theme arose to examine the potential of bait shrimp. In collaborative agreement with the SC Shrimp Growers Association, the USMSFP is moving forward with such an effort in its 2005 Implementation Plan. This has also established the theme of this issue of *Industry Briefs*. Our feature article by Ryan Gandy summarizes his work in Texas on the technical feasibility of intensive bait shrimp culture. Rick Eager discusses the future of bait shrimp as a viable industry in South Carolina. This collaboration and results of the USMSFP collaborative efforts on TSV in Texas will be a key portion of our upcoming USMSFP Special Session at Aquaculture America 2005 in New Orleans. It all boils down to priorities and how they can be reasonably addressed. The USMSFP is committed to expansion of the domestic shrimp farming industry and being responsive to its needs.

U.S. Farmed Shrimp Production 1988-2004



* Estimated 11.1 million pounds (16% ↓ from 2003)

U.S. shrimp farm production has increased rapidly over the last six years, but low prices and disease outbreaks have driven down estimates for 2004. (Source: USMSFP data)

Rick Eager - the future of bait shrimp farming in South Carolina

A USMSFP Interview. Retired from the Fish & Wildlife Service in 1992, Rick Eager, owner and operator of Swimming Rockfish and Shrimp Farm, started in the farming business with plans for striped bass culture. But due to low prices Rick considered using his farm to grow mud minnows. Then he was introduced to the world of bait shrimp species and hasn't looked back. Rick now produces a wide variety of bait species including fiddler crabs. He also grows out hybrid striped bass and red drum, not as a food product, but for recreational ponds. "The margins for producing bait are much greater than for food. I can sell these fish for \$6/lb to stock into ponds. I can never get that selling them for food."

And so it is with bait shrimp. *Industry Briefs* interviewed Rick on the phone on his way home from deliveries. A cargo of *L. setiferus* was scheduled for sale the next day to some of his 35 local bait shrimp distributors. "I bought these animals at \$125 for 12 lbs, and will get double that price tomorrow when I sell them." Those are the types of margins that peak the interests of shrimp farmers across the state especially during these hard times and down prices for food shrimp.

According to Rick, there is a great need for a steady supply of bait shrimp, especially *L. setiferus*, during the summer months. Between January and mid-June, Rick obtains most of his bait shrimp as *F. durorum* from the Gulf of Mexico, where there is a thriving industry of about 1,400 boats fishing mainly for bait. But, by mid-late June, water temperatures in the Gulf get too high and numbers of postlarvae go down, and he must rely on obtaining animals from the East coast. He normally obtains *L. setiferus* locally between July and September, but the supply

Continued on Page 4

USMSFP Technical Committee Meeting addresses industry priorities

By Anthony C. Ostrowski. Each year, the USMSFP reassesses its focus and challenges all existing projects to determine whether satisfactory progress is being made, current priorities are sufficient to justify continuing investment, and newly defined problems are receiving adequate attention. Input is sought from the private commercial shrimp production and support sectors in the U.S. to identify opportunities to increase profitability, ensure sustainability, and continue expansion of the industry. This is done usually through farm site visits, phone calls, e-mails, the USMSFP website, and special USMSFP session at Aquaculture America. Over the past year, this communication was further facilitated by invites to attend the Texas Aquaculture Association Meeting and meeting of the South Carolina Shrimp Farmers Association. At both events, shrimp farmers were able to exchange with me their individual and group viewpoints, concerns, and ideas for the future. These exchanges with farmers and other industry sectors and ability to see, first-hand, the state of the industry are of critical importance to the responsive-

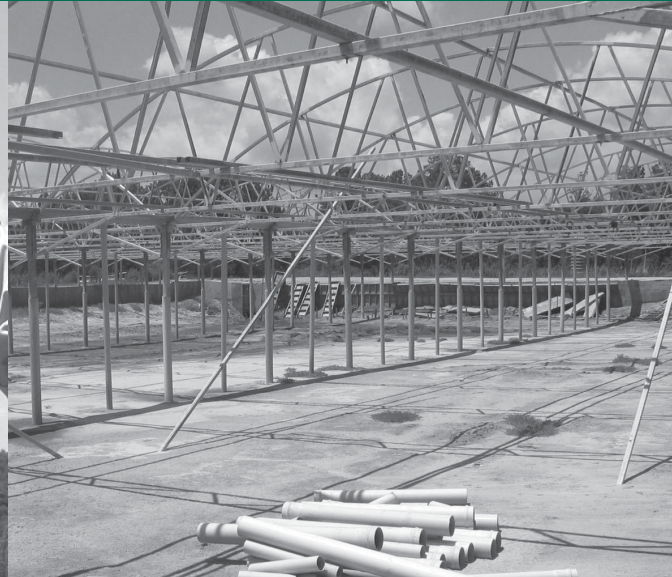
ness of the program to industry and help shape the thoughts and directions of the principal investigators involved.

The issues and priorities of U.S. shrimp farmers weighed heavy on the minds of the USMSFP technical committee as it entered its annual meeting this past August in effort to respond to the rapidly changing conditions of the domestic industry. In fact, the USMSFP had already redirected some of its activities to collaborate in the investigation of the TSV outbreak in Texas. Farmers were united in indicating the following priorities: to develop a faster growing and/or cold tolerant line of shrimp; to continue to address the causes and remediation of blackspot and NHP; to examine the feasibility of alternative species, especially bait shrimp species, to provide a new dimension to the industry easily adaptable by current farmers; to examine better ways to dispose of effluent including its use for irrigation; and, to explore the feasibility of organic or niche farming approaches. The Technical Committee emerged from its meeting seeking innovative ways to continue

Continued on Page 6



Rick Eager speaks out on the future of the bait shrimp industry in South Carolina.



A brand new 21,000 square foot covered growout facility was planned to be up this summer. But, due to hurricanes those plans are on hold until 2006.



Swimming Rockfish and Shrimp Farm bait shrimp as seen through the initial construction of his building expansion.

Rick Eager - the future of bait shrimp farming in South Carolina (continued from P2)

is limited and the animals normally small, about 200 count. He sells bait shrimp when they reach 100 count, and ideally at 70 count (that's a 5 gm animal). It takes him 45 days of pond rearing to get his bait shrimp to 100 count. Rick estimates that he can easily sell about 1 million bait shrimp in June and July alone at his current rate of buying shrimp for \$0.10 each and selling them for \$0.33 each. That's a lot of additional cash flow. In fact, Rick says the demand is so great because of coastal expansion in south Florida adding more people who love to fish, that he literally has to turn customers away.

That is why Rick is so motivated to promote a bait shrimp hatchery. In fact, the reason he was so free at supplying *Industry Briefs* with information, at the risk of others wanting to get in the business, was because, "I want see the demand for bait shrimp go so high that someone starts a hatchery." And the reason is, "...because I want to make more money." In fact, it is cheaper for Rick to growout his bait shrimp than buy them at a larger size. That is the reason for recent expansion plans. A brand new 21,000 square foot covered growout facility was planned to be up this summer. But, due to hurricanes, those plans are on hold until 2006. The intent is to stock the facility with one-million postlarvae and crop it so it will never reach over 7,000 lbs/acre total biomass. Rick admits his plans are risky as his current supply is not all that reliable. He would love to start with animals as small as 500 count and be sure he can stock all at once. And that's the advantage of a hatchery, "consistency of supply and quality."

And what about species? "We need a *setiferus* hatchery." According to Rick, *F. aztecus* do not do well in extreme heat or cold, and he has never gotten *P. duroram* to grow well. "*Setiferus* are the hardiest." Handling of animals is a big issue and is the biggest draw on profitability at his site. "You typically loose 10% of the animals during any move, including when

you pick them up, harvest them from the pond, put them on the truck, and to ship them to the shop." In all, Rick says he can expect a loss of up to 30% of the animals he buys from suppliers before they are sold to fishermen. But that is still well within his profit margin. As far as his advice to others who might want to enter the business, Rick says to follow the KISS principle, "keep it simple stupid." Concentrate on proper dissolved-oxygen levels and buy reliable equipment. Rick also says, "you can't make money growing shrimp, you make money selling them." That's great perspective on the business that customer service, education on training clients proper ways to handle the animals, proper tank size, and set-up is key. He also indicates it is critical to train clients to count their shrimp when they sell them, not just "scoop" them out of the tank. "Over-scooping" by employees looses money for the shop, but also affects the suppliers credibility when the store owner thinks he was not sold the agreed amount.

In parting, Rick wanted to emphasize that while the profit potential for bait shrimp is greater than for food shrimp, "a small number of farms can saturate distribution." But, he sees no problem with the future as current demand continues to rise. Rick is confident that if a hatchery were created to provide a consistent supply of stock, the bait industry could easily expand the current market.

Rick Eager is one of three bait shrimp distributors currently operating in South Carolina. There is also one farm that only grows bait shrimp. Swimming Rockfish is the only farm that distributes bait shrimp as well. Rick looks forward to the future of this industry in South Carolina.

For more information on Swimming Rockfish and Shrimp Farm - go to
<http://www.usmsfp.org/farm-websites/farms/swimmingrockfish.htm>
 Email: dreager@viperlink.com

Aquaculture America 2005



January 17-20, 2005
Marriott New Orleans
New Orleans, Louisiana
USA

Aquaculture America Returns to New Orleans

Aquaculture America 2005 returns to one of the favorite tourist spots in the world for THE only major national aquaculture conference and exposition held in the U.S. The U.S. Aquaculture Society joins with the National Aquaculture Association and the U.S. Aquaculture Suppliers Association to produce the annual Aquaculture America meetings. These sponsors are joined by the annual meetings of Aquacultural Engineering Society, American Tilapia Association, Striped Bass Growers Association, U.S. Trout Farmers Association, U.S. Shrimp Farming Association, to make Aquaculture America 2005 the one meeting in the U.S. that you don't want to miss!



New Orleans

Aquaculture America 2005 is the place to learn about the latest in aquaculture, see the newest technology in the trade show and have a great time in the many fantastic restaurants, bars and entertainment sites in New Orleans.

Expanded Producer Program

Aquaculture America 2005 is known for the high quality of its Producer Program organized by NAA. Aquaculture America 2005 will continue to expand the size and scope of the producer program to address all of the issues facing producers in the U.S. as well as around the world.

Special Session: U.S. Marine Shrimp Farming Program

TSV in Texas 2004, Summary of a Collaborative Research Program Involving Commercial Shrimp Farms and Several State and Federal Institutions and Agencies., A.L. Lawrence, J.Fox, K.Gaines, K.Gregg, P.Varner, K. Hasson, Y.S.Juan, D. V. Lightner, J. M. Lotz, A.C. Ostrowski, G. Treece, P. Larkin, D. Moury, and R. Adami.

Review of the Epidemiology of TSV. J. M. Lotz, R. Adami, Y. S. Juang, A. L. Lawrence, D. V. Lightner, A. C. Ostrowski, and M. A. Soto.

Distinguishing allele characteristics of TSV-Resistant shrimp of the USMSFP. A.Alcivar-Warren, Z. Xu, D. Meehan, A. Slate, A. Wolf, and L. Steinberg

The 2004 outbreaks of white spot disease in Hawaii and Taura Syndrome in Texas: Implications to a sustainable domestic shrimp farming industry. D.V. Lightner, F.J. Tang, B.T. Poulos, S.A. Navarro, R.M. Redman, R.A. Duhaime, K. Gregg, D.R. Montgomery-Brock, and J.N. Sweeney

Evaluation of selectively bred Pacific white shrimp *Litopenaeus vannamei*: New challenges and new opportunities. S.M. Moss, D.R. Moss, C.A. Otoshi, S.A. Arce, and O.L. Hennig.

Current applications and future implications for commercial expansion of superintensive shrimp production systems. H. Atwood, B. McAbee, K. Houston, C. Browdy, and A. Stokes.

Optimization of Sequencing Batch Reactor (SBR) for the Treatment of Shrimp Aquaculture Wastewater. R. Boopathy, K. Hassan, Q. Fontenot, and M. Kilgen.

Economics of Super-intensive Shrimp Recirculating Systems. T. R. Hanson and B.C. Posadas.

Strategies and focus of the U.S. Marine Shrimp Farming Program in a changing world market. A.C. Ostrowski, A. Alcivar-Warren, H. Atwood, C. Browdy, R. Boopathy, J. M. Lotz, A. L. Lawrence, D.V. Lightner, and S. M. Moss.

What is Taura syndrome?

Taura Syndrome (**TS**) is caused by the Taura syndrome virus (**TSV**), a single-stranded RNA virus in the family *Picornaviridae*. TS generally occurs over the course of a single molt in juvenile shrimp and may have a sudden onset within 5-20 days or a more chronic course of several months. Signs of infection include weakness, a soft shell, an empty digestive tract, and diffuse expansion of red chromatophores in the appendages. Mortality can vary from 5-95 percent.

Farmed shrimp species vary in their susceptibility to TS. Pacific white shrimp (*L. vannamei*), and the white shrimp (*L. schmitti*), are the most susceptible species. There are three native shrimp species of commercial importance in the Gulf of Mexico, brown shrimp (*F. aztecus*), pink shrimp (*F. duorarum*), and white shrimp (*L. setiferus*).

Experimental studies have found these three species are susceptible to TS. Potential routes for introduction of shrimp viral diseases to aquaculture facilities include infected broodstock, contaminated vehicles, containers, and other fomites, and transfer by birds and bird feces. For additional information about potential routes of shrimp viral disease transmission, see the April 23, 2004 impact worksheet about white spot disease of shrimp in the US.

This worksheet can be found at http://www.aphis.usda.gov/vs/ceah/cei/wsd_us_0404.htm. Sources: Brock JA. Special topic review: Taura syndrome, a disease important to shrimp farms in the Americas.

Industry profile: Ryan Gandy



Ryan Gandy has recently taken a position with Mote Marine Laboratory in Sarasota, Florida as the Shrimp Program Manager. His current research is focusing on development of sustainable closed recirculating and water re-use technology for the production of *Litopenaeus vannamei* at high density in low salinity well water. This research is specifically focused on the development of production strategies which manipulate primary production within the culture environment. "Developing sustainable high density shrimp production can only be achieved through a detailed understanding and control over culture water environment." Additionally, this research is developing water systems to process and re-use all production water for each successive grow-out. "Presently the greatest threat to domestic shrimp producers is imports from abroad. While U.S. farmers can not compete with cheap imports they can however, develop products which are marketed as environmentally friendly, sustainable, fresh and healthy for consumers. Additionally, diversification of U.S. farmers into other markets such as live bait shrimp has the potential to provide income which is sheltered from foreign imports."

USMSFP Technical Committee Meeting addresses industry priorities (continued from P3)

ongoing efforts and find workable solutions that might have immediate payoff to farmers to weather the existing storm. Some highlights include: efforts to examine hybridization of USMSFP growth and TSV-resistant lines which have sufficient genetic variability that could result in the generation of a separate line with the best characteristics of both; enhanced training programs for the domestic industry on biosecurity issues and closer interaction on surveillance programs with state extension agents; renewed and expanded efforts on NHP and blackspot; and production system development re-focused and driven by economic rather than biological factors. Of note, is the examination of baitshrimp pro-

duction that was fostered by inputs from farmers in Texas and South Carolina. A collaborative effort with the S. Carolina Shrimp Growers Association is being examined that would include the USMSFP priming a commercial baitshrimp effort in the state with a run of *L. setiferus* by early 2006. That would provide postlarvae to interested farmers in South Carolina and Texas. Waddell Mariculture Center, Texas Agricultural Experiment Station, Port Aransas, and the Gulf Coast Marine Lab are currently working out the details and feasibility of a project with the required quarantine efforts to ensure SPF animals.

Current Status of Bait Shrimp Research...

continued from P1

During this period some commercial farms began investigating the potential of using this species as alternative to *L. vannamei* and for the production of bait shrimp. Samocha et al. (1998) while working with this species in small earthen ponds at a density as high as 700 PL/m² reported a yield as high as 3.1 kg/m² of 6.2 g size shrimp in 94 d with survival rate of 73.6%. Furthermore, mass production of frozen bait size shrimp of this species by this farm showed difficulties in marketing of the product. In 1997, TAES began investigating the retail market structure of the live bait shrimp industry along the Texas coast and found the market to be severely under supplied during an eight month period when demand was at its peak.

The identification of wild coastal populations of *L. setiferus* infected with white spot like virus and the poor growth performance of this species to edible size brought PL mass production to a stop. Lack of available PL forced these researchers to produce PL from wild sourced broodstock. To minimize the risk of bringing infected animals from the wild, a decision was made to collect spawners of *F. aztecus* from deep waters (50 m). Research activities at the TAES facilities from 1997 through 2001 focused primarily on intensive greenhouse nursery, pond and indoor closed recirculating production with limited discharge of *F. aztecus* as bait shrimp. Nevertheless, a small population of *L. setiferus* was acquired at the beginning of this period and was raised in an indoor closed recirculating system. This indoor system was successful in producing 7.5 g shrimp with a yield of 3.75 kg/m².

Success obtained in the nursery and grow-out phases of *L. vannamei* under limited discharge led to testing of the same production management strategy applied to the culture of *F. aztecus*. Under conditions of limited discharge, nurseries were able to produce 0.75 to 1.0 g shrimp in 70 d at a yield of 1.93 kg/m² and survival rates of 95%. Once transferred to grow-out ponds at a stocking density of 162 shrimp/m² shrimp reached bait size 5.3 g in 129 d with a survival rate of 74%. When taken to market these shrimp were found to have significantly better survival than wild bait shrimp in adjacent tanks. Retailers indicated that with farm-raised shrimp they could expect a 40% higher survival rate over the wild caught shrimp. In addition, these shrimp commanded \$7.00/lb which was double the price of wild caught live bait shrimp.

Domesticating a broodstock population free of known viral disease became the major objective of this research team. In 1999 (Phase I USDA SBIR) and in 2001 (Phase II USDA SBIR) were awarded for clos-

ing the life cycle of *F. aztecus* and *F. duorarum* and developing effective closed recirculating systems for maturation and larval rearing. The closed recirculating larval rearing system was successful in producing PL for 6 larval rearing cycles with 100% of the culture water re-used (including for algae cultures) during each cycle. Maturation research effectively isolated F and F1 broodstock of both species which were free of known viral diseases (IHNV, TSV and WSSV) when tested using a two step PCR procedure. These studies resulted in closing the life cycle of *F. aztecus* in closed recirculating systems and development of an F1 broodstock population of *F. duorarum*.

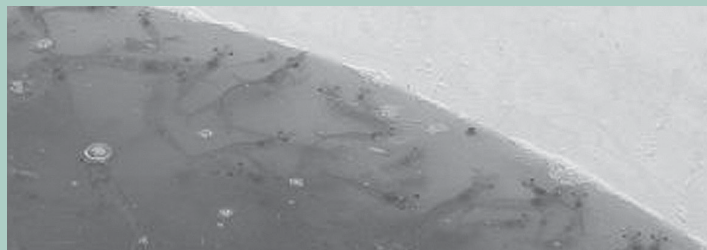
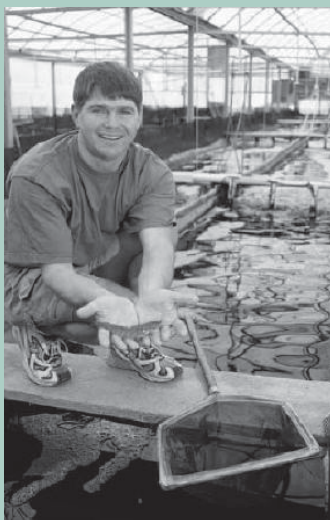
Efforts to close the life cycle of *F. duorarum* were precluded by the finding of a potentially unknown viral pathogen which may have originated from the *F. duorarum* F population sourced for these studies. Current research at the Texas Veterinary Medical Diagnostic Lab (TVMDL) in College Station, Texas under the direction of Dr. Ken Hasson has found this pathogen effectively infects both *L. vannamei* and *F. duorarum* in bioassay with frozen tissues. This represents a severe limitation to the development of a sustainable and biosecure farm-raised bait shrimp production industry in the United States. If bait shrimp farming is to develop in a sustainable manner efforts

need to be made to identify lethal viral pathogens of endemic shrimp populations and use that information to develop a viral-pathogen-free line of native shrimp for the bait shrimp market. Only after a program to develop SPF lines of native species along the lines of the USMSFP program for *L. vannamei* will sustainability develop in this fledgling industry.

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Bait shrimp in tank at Texas Agricultural Research Station.

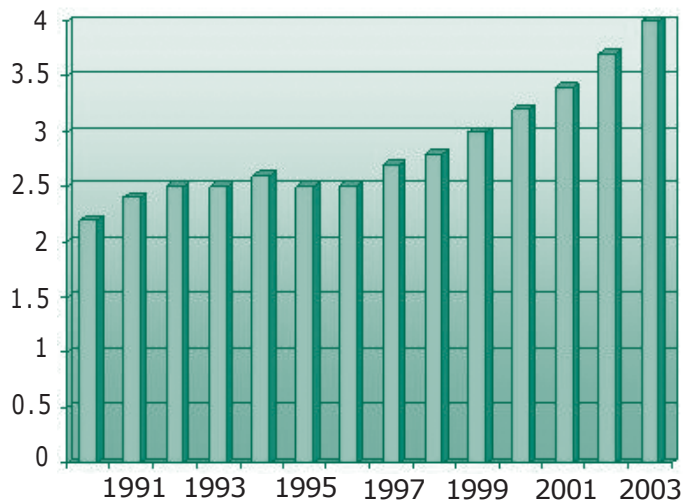
Coming in the January 2005 Issue...

Don't miss our next issue of Industry Briefs! Highlights include the successful strategies of the 2004 season, including co-op efforts in Arkansas, fast-growing shrimp in Michigan, and organic feed development in South Carolina.



Shrimp Consumption 1990-2003

shrimp's popularity continues to grow



Shrimp consumption hit an all time high in 2003- an overwhelming 4.0 lbs. per capita. Tuna remains the nation's second favorite seafood at 3.4 lbs. and salmon continues to hold the #3 spot at 2.2 lbs. *Source: National Fisheries Institute*

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