AQUANEWS

Sustainable Aquaculture for a Secure Future

AQUACULTURE COLLABORATIVE RESEARCH SUPPORT PROGRAM

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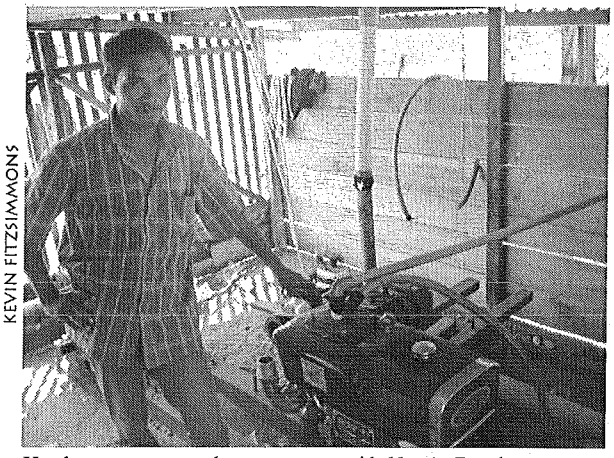
ACRSP Helps to Rebuild Aquaculture in Wake of Tsunami

By Kevin Fitzsimmons
University of Arizona

Much of the shrimp farming industry of southern Thailand and Indonesia was destroyed by the tsunami of December 2004. A total of 392 villages and an estimated 54,500 people were affected by the tsunami, with more than 100 deaths recorded and many others missing. Over 4,500 fishing boats were destroyed or seriously damaged, and tens of thousands of people were left without jobs, incomes, or many alternatives to help them survive.



KEVIN FITZSIMMONS

Hatchery manager and new pump provided by AwF and partners as part of the restoration project in Aceh Province.

As the region begins to rebuild much of what it lost, many have recognized the opportunity to promote a more sustainable system of coastal aquaculture based on an integrated system of fish, bivalve, and seaweed culture rather than the monoculture of shrimp that previously dominated the Indian Ocean coastlines of Thailand and Indonesia. The Aquaculture CRSP was one of several government, fishery, university, and nongovernmental organization groups to recognize this potential to pull a benefit from the tragedy, and two ACRSP researchers mobilized the resources necessary to conduct an education effort for those who are trying to rebuild in the tsunami's aftermath.

The overall goal of the project was to contribute to the restoration of aquaculture in Aceh Province by capacity building and directing the restoration efforts toward a sustainable coastal aquaculture methodology rather than a return to monoculture of shrimp in mangrove estuaries. In March 2006, Aquaculture CRSP Principal Investigator Kevin Fitzsimmons departed Tucson, Arizona, bound for Banda Aceh, Indonesia. He was joined in Banda Aceh by Co-PI Amrit Bart and one of Bart's graduate students, Agus Somamihardja. Agus, a native of Indonesia, provided extensive technical contributions as well as all translations.

Aquaculture without Frontiers (AwF) matched funds with the ACRSP in support of the project, which includes a wide-ranging tsunami restoration project in Thailand and Indonesia. The AwF contribution included support provided by the YSI – World Aquaculture Society Tsunami Relief Fund to expand the project with workshops in Banda Aceh and site visits to active restoration projects.

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ACRSP Annual Meeting 2006

By Jim Bowman

ACRSP held its 2006 Program and Technical Committee Meetings in Florence, Italy, on 8 and 9 May just prior to "Aqua 2006," the world conference sponsored by the World Aquaculture Society (WAS) and European Aquaculture Society (EAS). Participants worked through an extensive agenda during the two-day meeting, which covered a wide range of business items and project reports. The first day's business included recaps of the regional meetings held in 2005, a session of research project overviews, and a discussion of a number of jointly funded projects with NOAA Sea Grant College Program and Heifer International. On day two, participants split up into Regional Team break-out groups to refine regional priorities formulated during the 2005 meetings (Africa, Asia, and the Americas). Following reports back to the group at large, an additional round of break-out meetings was held to discuss needs associated with the thematic areas of Applied Technology and Extension Methodologies, Production System Design and Integration, Environmental Impacts Analysis, and Sustainable Development and Food Security. An afternoon discussion on methods of assessing and reporting on the impacts of ACRSP efforts comprised the final session for this annual meeting.

A special highlight of the two-day Annual Meeting was the Host Country PI luncheon. This session provided an opportunity for more intimate interaction between ACRSP personnel and researchers in ACRSP Host Countries.

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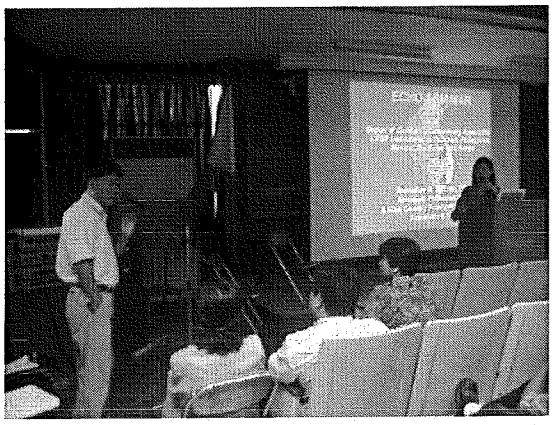
Echo Seminar Shares Findings in the Philippines

By Remedios Bolivar
Central Luzon State University
Nueva Ecija, Philippines



REMEDIOS BOLIVAR

The first of the HCPI exchange project echo seminars received bountiful attendence at Central Luzon State University.

After all the site visits were completed in the Aquaculture CRSP project entitled "Training and Information Exchange on Cichlids among Aquaculture CRSP Host Country Institutions," the HCPIs decided that one of the important deliverables should be an "echo seminar" where they could share the findings of their exchange visits to co-workers and students of their home institutions.

The HCPI from the Philippines, Remedios B. Bolivar, conducted the first of these seminars on 27 February 2006, at the Freshwater Aquaculture Center (FAC) at Central Luzon State University, Philippines, during the 3rd Fisheries Science Week Celebration of the College of Fisheries (CF). The event attracted 84 students, 24 fisheries alumni, 20 guests and visitors, and 20 faculty and staff of the CF-FAC to learn how aquaculture practices and goals in the Philippines compare to other countries in the ACRSP network.

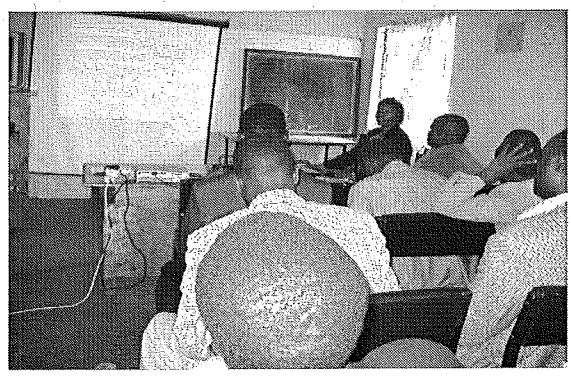
The Echo Seminar focused on technologies developed through ACRSP research on cichlid culture, as well as the general status of cichlid culture among Aquaculture CRSP institutions in Thailand, Philippines, Mexico, Honduras, and Kenya. Bolivar reported that the participants also considered technologies developed by other agencies independently or through partnerships with the ACRSP. As a result, the audience was able to share in the same discoveries that the HCPIs made about their different aquaculture practices and gain an appreciation of the Philippines' unique progress in the development of genetically improved strains of tilapia for aquaculture.

The Aquaculture CRSP has funded research, in large part focused on some aspect of cichlid aquaculture, throughout the globe since 1982. However, there has been little opportunity for intensive information exchange between long-term Aquaculture CRSP Host Country PIs. The HCPI exchange project project was conceived to bridge this gap and facilitate the sharing and effective dissemination of information, methodologies, and technologies on cichlid biology and culture between sites. The knowledge gained through these visits will be applied towards accelerating aquaculture growth when the participants return to their home countries.

Kenya Echo Seminars Build on New Global Relationships

By David Glindmeyer

Shortly after the final HCPI Project visit, the participants from Kenya exceeded their reporting duties by conducting four echo seminars throughout Kenya. Benson Thiga, who traveled to the Philippines and Thailand as part of the HCPI Project, and three others—Beatrice Nyandat, George Owiti, and Raphael Mblauka—presented in the Bungoma, Busia, and Kisii districts of Western Kenya and the Sagana Fish Farm, located in Central Kenya.



BENSON THIGA

One of four echo seminars that the Kenya project conducted in various regions of the country. In all, twenty-six officers and policy-makers were among the audience.

From 10 to 12 April 2006, seminars were held at the Mabanga Training Centre in the Bungoma District, at the District Offices in the Busia District, and at the District Fisheries Offices in the Kisii District, respectively. During these three days, the knowledge gained during the HCPI Project was extended to regional students, professionals, and policy-makers, with a total of thirteen officers in attendance. A month later, on 10 May 2006, the final seminar was held at Sagana Fish Farm for which the audience came from the Central, Eastern, and Rift Valley Provinces of Kenya. These attendees, which added another thirteen officers and policy-makers for a project total of twenty-six, included the noteworthy people of John Kinyanjui, the Assistant Director of Fisheries – Central & Eastern Provinces, and Nancy Gitonga, Director of Kenya Fisheries Department and one of the five charter members of the HCPI Project.

The seminars provided time after each presentation for the attendees and project participants to discuss how this cross-cultural exchange experience could further aquaculture in Kenya. It was during these discussions that participants unanimously agreed that

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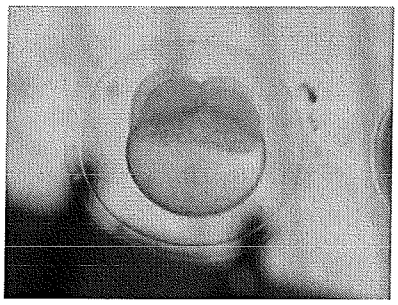
A First for the Amazonian Catfish

By Konrad Dabrowski
The Ohio State University

In the Amazon River and its tributaries, many species of *Psudoplatystoma* catfish reach a harvestable size of 15–20 lbs. These catfish attract high market values among consumers in South America, Brazil, Peru, Colombia, and Bolivia, making them economically important in the region. Unfortunately, the wild harvest of fish from the Amazon, Parana, or Orinoco rivers and tributaries has become increasingly limited in the face of these species' high nutritional value and market demand. As a result, aquaculture of these species is becoming a national priority.



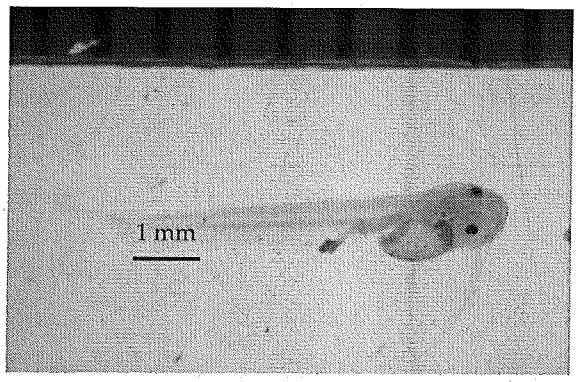
Research results from a collaboration between the aquaculture program at The Ohio State University's School of Environment and Natural Resources, the Sao Paulo State University (UNESP) in Jaboticabal, Brazil, and The University of San Marcos (USM) in Lima, Peru, came to fruition recently when the first baby fish from a species of Amazonian catfishes (genus *Pseudoplatystoma*) were born in February 2006.

This success is the end result of nearly three years of research that began with funding from OhSU and has garnered continuing support from the Aquaculture CRSP and the Peruvian Science Foundation (CONCYTEC). The research team gained initial knowledge in the larval rearing of the Amazonian catfish prior to ACRSP involvement in the project when a batch of newly hatched larvae arrived from Brazil by Dr. Maria Celia Portella (UNESP), with instructions regarding rearing conditions.

In attempting to further unlock the secrets of this species' reproduction, the researchers practiced monitoring of gonad development and profiling of blood steroid hormones, as well as trials to mimic proper water temperature and light regimes.

The final "resolving" dose of hormonal treatment induced female catfish to release the fertile eggs. Males were already waiting with their sperm for more than a year and successful fertilization followed. Finally, several thousand hatchlings 3.5 mm in length were out of their shells within 14 hours, one of the fastest rates of embryonic development in vertebrates, and within the next several hours they were ready to feed.

Of course, the research will not end with this first successful reproduction. Studies at OhSU with this species can now be now carried out in concert with research efforts in their native countries and contribute to the faster development of culture methods, determination of nutritional requirements, and better understanding of reproductive physiology. Domestication of the Amazonian catfish and selective breeding will be the next goal of this research.



Top Center: Embryo, four cells, 1 hour after fertilization.

Middle Right: Pseudoplatystoma larvae (fed Artemia nauplii, 5 days old).

Bottom Right: Spawning of Amazonian catfish.

Photos by: KONRAD DABROWSKI

Graduate Student Profile: Idsariya Wudtisin

By Chris Bridger

"Thailand has numerous resources and the landscape allows us to be fruitful in agriculture." This was the response of Idsariya Wudtisin when asked what makes her home country an excellent place to develop aquaculture.

Wudtisin has been working on an Aquaculture CRSP sponsored project, under the supervision of Dr. Claude Boyd, since moving to Auburn in the spring of 2003. She credits Dr. Boyd for her decision to attend Auburn University to pursue a Ph.D. degree. "I have known him since I was in Thailand – not personally, but I used his book for my class and for my research. Then I had a chance to come to Auburn and work under his supervision," she said.

PHOTO COURTESY OF GLOBAL WATER WATCH

Wudtisin presented some of her findings at the Aquaculture America 2005 conference in New Orleans during a special CRSP Research session. Her presentation, entitled "Bottom soil quality in ponds for culture of catfish, freshwater prawn, and carp in Thailand" and co-authored with Dr. Boyd, demonstrated that pond age (1 to 30 years in use) was not a factor influencing the physical and chemical composition of pond soils. Their conclusion was that "normal procedures of pond soil management e.g., drying bottoms between crops, liming, and periodic sediment removal, were effective in maintaining good sediment quality in freshwater aquaculture ponds over a period of at least 30 years."

When asked to describe her future research plans to complete her Ph.D. in 2006 Wudtisin initially responded with "talking about aspects of my research, it depends on how much time you have!" Her overall research plan is focused upon bottom soil quality of catfish, prawn, and carp ponds in Thailand. The premise for her dissertation is that bottom soil quality should be controlled in order to maintain and improve upon present production levels. For example, Wudtisin explains that while use of antibiotics (such as tetracycline) might be beneficial in the short-term, these chemicals may accumulate in pond bottom soil and affect pond productivity over longer periods of time.

While Wudtisin feels that Thailand has numerous resources, there is also a general lack of financing that has limited aquaculture growth in her home country. In addition, from her perspective, "one of the true major obstacles is the use of suitable technology. Most farmers in Thailand lack the correct knowledge in aquaculture, which leads to the improper use of technology to solve the problems."

As to her future endeavors, this native of Rayong Province in the Eastern of Thailand says she "enjoys conducting research since I have an opportunity to apply what I learn in the classroom into reality, which I find very interesting and challenging." Wudtisin plans to "expand [her] horizon, gain more experience in research, and prepare myself for the practical problems in aquaculture." We wish Idsariya Wudtisin all the best with her dissertation research and many future endeavors.

Seventh International Symposium on Tilapia in Aquaculture

The Seventh International Symposium on Tilapia in Aquaculture will be held 6 through 8 September 2006, at the Veracruz International Convention Center in Boca del Río, Veracruz, Mexico. The State of Veracruz and the American Tilapia Association (ATA) will sponsor the conference, and Panorama Acuicola Magazine will host it. The Aquaculture CRSP will co-sponsor the event along with the Aquaculture T.I.E.S. project, World Fish Center, and the Latin America Chapter of the World Aquaculture Society.

As the official announcement describes, "This will be the seventh of the highly successful series of symposia that have brought together tilapia biologists to review the latest discoveries in tilapia biology, ecology, improvements in production systems, and other fields related to tilapia and their use in aquaculture . . . This symposium will have a special emphasis on the rapid advances in genetics, development of advanced breeds, the development of international markets, and opening new markets for Mexican-produced tilapia products. This symposium will include a trade show, which will provide a forum for industry suppliers, seafood marketers, and the aquaculture press to meet directly with researchers and producers. Field trips are being organized to nearby aquaculture sites."

For further information, visit the symposium website: <http://ag.arizona.edu/azaqua/ista/ISTA7/ISTA7.htm> or contact Kevin Fitzsimmons at kevfitz@ag.arizona.edu.

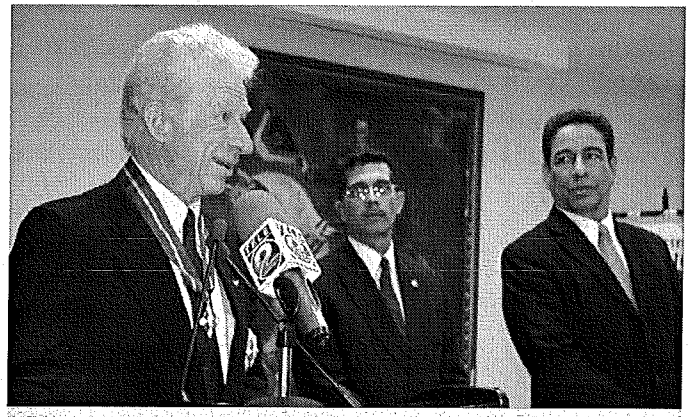
Panama Honors Early ACRSP Developer

By Jeff Burright

On 24 April 2006, the government of Panama honored a member of the original ACRSP leadership team, Dr. R. Oneal Smitherman, with the order of Vasco Nuñez de Balboa in the grade of Gran Oficial (great official) in recognition of the contributions he provided to aquaculture in the country.

Smitherman, in cooperation with researchers from Oregon State University and the University of California Davis in the late 1970s and early 1980s, represented Auburn University's initial involvement in the selection of sites that would later comprise Aquaculture CRSP framework. Management of the program ultimately came to OSU, but Smitherman remained involved in the Board of Directors and was an editor of the first pond dynamics book the Aquaculture CRSP produced, *Principles and Practices of Pond Aquaculture: A State of the Art Review.*

The confirmation was given by the First Vice President and Minister for Foreign Affairs Samuel Lewis Navarro.



RICHARD PRETTO

Top Right: Dr. Smitherman, Ministro Salazar, and Viceministro Santamaría during the ceremony.
Right: Dr. Renford Smitherman directing and participating in the construction of the first and most important Panamanian Aquaculture Government Facility.

ACRSP Attends Philippines' Industry Gathering

By Remedios Bolivar

Twenty-two participants from Central Luzon State University, led by Host Country Principal Investigator Remedios B. Bolivar, attended the 3rd National Tilapia Congress and Fiesta Tilapia held at the Wow! Philippines Hilaga, San Fernando City, Pampanga, Philippines, on 2 to 4 March 2006. Aside from Bolivar, the delegation consisted of three project staff; two staff from the GIFT Foundation, International, Inc.; five graduate students; and 11 undergraduate students. Their participation in the 3rd National Tilapia Congress was made possible through project funds from the ACSRP, and the participants, most especially the students, were very thankful of the opportunity to attend such an event.

The theme of this year's National Tilapia Congress was "Building a Sustainable Industry." This event is considered the biggest gathering of tilapia growers, traders, suppliers, researchers, and other industry stakeholders to discuss critical issues confronting the Philippines' tilapia industry. The 3rd National Tilapia Congress and Fiesta Tilapia was organized by the Philippine Tilapia, Inc. in cooperation with the Department of Agriculture-Bureau of Fisheries and Aquatic Resources, the Department of Trade and Industry-Board of Investments, and the provincial government of Pampanga.

REMEDIOS BOLIVAR

Participants from the Central Luzon State University attend the 3rd National Tilapia Congress through ACRSP support.

Kenyan Echo Seminar

...continued from page 2

the findings of the Feed Satiation, Cage Cum Pond, and Pen Cum Pond research the ACRSP has conducted in the other Host Countries are particularly relevant to the Kenyan situation. In the end, the discussions led to a proposal that departmental institutions adopt these practices on a trial basis together with a few contact farmers.

Rebuilding in Wake of Tsunami

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The researchers held a series of three workshops on the 12th, 13th, and 14th of March—two directed towards artisanal aquaculture farmers in the tsunami impacted zone of Aceh province and one for representatives from NGOs, FAO, Indonesian Department of Fisheries staff, and faculty and students from Ladong Fisheries College—with attendance between 50 and 60 each day. Every participant received an illustrated seaweed culture book by Glenn et al. to assist the training efforts.

The tsunami recovery effort presented a unique opportunity to consider the ecology of coastal production systems and the need to improve pond dynamics. Each workshop reviewed the pre-tsunami status of shrimp farming, which included disease problems, effluent discharge issues, removal of mangroves, and declining yields and prices for shrimp. Information then followed detailing more sustainable methods of coastal aquaculture including diversification of products to include seaweeds, tilapia, milkfish, grouper, sea cucumbers, and bivalves.

The groups also discussed the current market conditions for shrimp and the other products the researchers promoted for consideration, including the supply to existing markets and how to reach or develop new markets for proposed crops. Small farmers have a great capacity to incorporate seaweed, fish, and bivalve culture with minimal resource inputs. Shrimp culture requires a greater investment of risk capital, and many of the farmers told the CRSP researchers that they would start with the polyculture concept in lieu of waiting for government or NGO support to restart shrimp farming.

In the afternoons, the team visited the hatchery restoration projects supported by AwF with donations from Yellow Springs Instruments and its employees. The hatcheries had been supplied with new roofs, water and air pumps, and the restoration of their electrical supply. One of the hatcheries had post-larvae almost ready for sale to local farms while another had water flowing, new broodstock on site, and *Artemia* in hatch tanks preparing spawning events. The third hatchery had roof and equipment installed, but was still some days from operational capacity and did not have any animals on site. It was clear that the aquaculture industry's infrastructure is beginning to renew.

Farmers and NGOs reported that they were anxious to implement various aspects that were presented and appreciated the supporting documentation provided directly to them as well as the volumes of technical documentation left with the research center and the school. Most of those attending shared their hope that the development of sustainable aquaculture operations in Aceh will help them avoid the downward spiral that had impacted them prior to the tsunami.

The project received support from the Aquaculture CRSP, Aquaculture without Frontiers, and logistical support (housing, transportation) from the Ujong Batee Aquaculture Research Center, and organizational support for workshops from Professionals International.

Attending NGOs included:
Mercy Corps
Professionals International
World Wildlife Fund
French Red Cross

Attending HPCIs:
Kevin Fitzsimmons
Amrit Bart

Ladong hatchery rebuilding project. CRSP researchers Amrit Bart, Kevin Fitzsimmons, Hasanuddin and Sugeng.

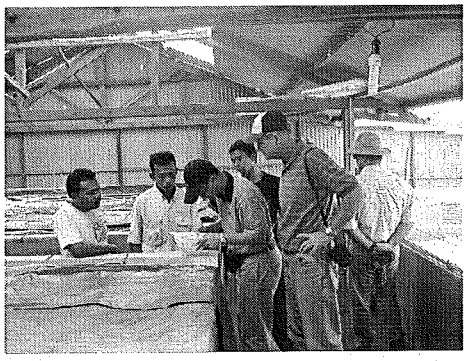
2nd International Symposium on Cage Aquaculture in Asia (CAA2)

The 2nd International Symposium on Cage Aquaculture in Asia (CAA2) will be held from 3–8 July 2006, in Hangzhou, Zhejiang Province, China. The Aquaculture CRSP is co-sponsoring this event.

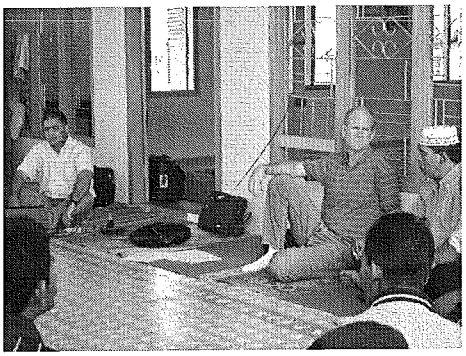
The symposium will be held in the International Conference Center of Zijingang campus of Zhejiang University, Hangzhou, China.

A group of prominent aquaculture/fisheries scientists and cage culture experts from around the world have been invited to be Keynote Speakers in support of CAA2.

Photos by: Kevin Fitzsimmons



Post-larval shrimp produced in rebuilt hatchery in Samalanga.



Discussions with farmers regarding the prices of aquaculture products.

ACRSP Annual Meeting 2006

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The WAS conference began in earnest on Wednesday, 10 May, and lasted through 13 May. The conference provided an opportunity for ACRSP participants to interact more broadly with the global aquaculture community and present their own research results, a substantial portion of which were associated with ACRSP research. On the final day of the conference, the ACRSP was the focus of a day session that gave attending participants an opportunity to present their technical research results. A structured question period followed involving all members in the audience, many of whom were not associated with the program but have experienced comparable research interests.

During the conference wrap-up session, ACRSP joined WAS and EAS in presenting student awards. In the case of ACRSP, student posters with topics related to sustainable aquaculture development were judged during the week-long meeting.

First Place

PRODUCTION OF MICROBIAL PROTEIN USING ACTIVE SUSPENSION TECHNIQUE (AST) IN ARTIFICIAL PONDS

M. Ekram Azim, David C. Little
University of Stirling
Scotland, UK

Second Place

A RECIRCULATING LIFE SUPPORT SYSTEM FOR THE PROPAGATION OF HARD CORALS TO SUPPORT THE AQUARIUM, BIOMEDICAL AND REEF REHABILITATION INDUSTRIES

Rush Battle, Ewen McLean, Steven Craig
Virginia Tech Aquaculture Center
Blacksburg, Virginia

Second Place

ISOLATION AND PURIFICATION OF BIO ACTIVE POLYSACCHARIDE AS AN ANTICOAGULANT FROM EDIBLE FERMENTED BROWN SEAWEED

Mahanama De Zoysa, Prashani Mudika Ekanayanke, Jeheed Lee
Cheju National University
Republic of Korea

Goings On

Congratulations to Aquaculture CRSP researcher Jim Diana, who was honored as the recipient of the 2006 Leonard Award from the Michigan Chapter of the American Fisheries Society on Tuesday, March 7 at the Kellogg Center at Michigan State University. The purpose of this award is to recognize outstanding professional competence and achievement of a professional employed in the field of fisheries or aquatic biology in Michigan. Diana was nominated by his former graduate students, thirteen of whom are current or former Michigan Department of Natural Resources fisheries management and research biologists.

The Aquaculture CRSP recently updated a virtual tour of the program on an all-CRSP website that showcases the successes of all of the Collaborative Research Support Programs. This site aims to inform policy-makers and the general public of the proven and potential benefits CRSPs foster toward global food and economic security. The site may be accessed at http://crsps.org, and the ACRSP section of the virtual tour is found at http://crsps.org/virttourF.htm.

Notice of Publication

Notices of Publication announce recently published work carried out under ACRSP sponsorship. To receive a full copy of a report, please contact the author(s) directly.

CRSP Research Report 06-207

ALTERNATE-DAY FEEDING STRATEGY FOR NILE TILAPIA GROW OUT IN THE PHILIPPINES: MARGINAL COST–REVENUE ANALYSES

Remedios B. Bolivar and Eddie Boy T. Jimenez
Freshwater Aquaculture Center and College of Fisheries
Central Luzon State University
Science City of Muñoz, Nueva Ecija 3120
Philippines

Christopher L. Brown
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Florida International University
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Nile tilapia, *Oreochromis niloticus*, were produced in an experimental, on-farm, grow-out cycle in which economic and production efficiencies were partially examined. Milled feeds were provided either daily (control) or on alternate days (experimental) at a given percentage of body weight, ranging from 20% initially to 2% at the end of the experiment. Growth, survival, feed conversion efficiency, cost, yield, and income were considered under the two strategies. Although the cost of feeds was cut in half by the experimental feeding treatment, feeding on alternate days did not reduce Nile tilapia growth or production performance variables, and yields were not significantly different. A trend favoring larger fish among the controls was not significant, and profit margins were higher for the alternate-day feeding strategy than for the control strategy. Although feed conversion ratios varied considerably among the nine participating farms, the improved efficiency in the experimental groups was consistently observed and was statistically significant. It is possible that the improved performance attained by alternate-day feeding is a result of reduced feed waste, either through more complete consumption of or improved nutrient absorption from available feeds.

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AQUANEWS

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