



## AQUAFISH COLLABORATIVE RESEARCH SUPPORT PROGRAM NEWSLETTER

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### AQUAFISH CRSP ANNUAL MEETING IN SEATTLE, WASHINGTON

In February of this year, AquaFish CRSP researchers and associates gathered in Seattle, Washington for the 2009 AquaFish CRSP Annual Meeting. On 15 February, the 40 meeting attendees from 14 different countries gathered in downtown Seattle over coffee and tea. After this friendly start on a Sunday morning, they settled into a day-long session of presentations and discussion. AquaFish CRSP Director Dr. Hillary Egna opened the day with welcomes and introductions followed by short updates

by each of the lead Principal Investigators on their AquaFish projects and reports from the DTAP Lead Coordinators. Following a working lunch among the Lead Principal Investigators and a Host Country PI luncheon, participants reconvened for discussion on a variety of topics fostering collaboration. The meeting was adjourned promptly at 5:30 pm, allowing the participants to register for Aquaculture America 2009 (AA09) before the opening session of the conference the following morning.

*...Seattle continued on page 5*



Participants in the Lead Host Country PI luncheon in Seattle gather for a photo. At the luncheon, the participants discussed ways of integrating the central projects with core research and the internal technical advisory panels.

Pictured from left to right, standing: Ford Evans, So Nam, Prum Somany, Yang Yi, Eladio Gaxiola Camacho, Erick Sandoval Palacios, Héry Coulibaly, Wilfrido Contreras de Sánchez, Sebastian Chenyambuga, and Stephen Amisah. Seated: Charles Ngugi, Evelyn Grace de Jesus-Ayson, Hillary Egna, Remedios Bolívar, Tran Thi Thanh Hien, and Maria Célia Portella.

## Goings-on in the Pond...



The First International Symposium on Aquaculture and Fisheries Education (ISAFE) is being held this November in Bangkok, Thailand. The event will bring in distinguished speakers from around the world to discuss aquaculture and fisheries issues and how education can support the industry. *More information is available on page 10*



The AquaFish CRSP issued a request for proposals (RFP) in November 2008 for research projects that address critical issues faced by aquaculture development and aquatic resources management in the IEHA\* countries. The RFP closed in February 2009 and the ME is in the final stages of the proposal review process.

\*Initiative to End Hunger in Africa

Jim Diana, AquaFish Lead Principal Investigator from the University of Michigan was recently named Director of Michigan Sea Grant, a joint program of The University of Michigan and Michigan State University.

Earth Fair at Oregon State University (OSU) was held this year on 21 April, with the AquaFish CRSP hosting one of 40 booths set up by campus departments and organizations promoting sustainable practices. The AquaFish booth was a great success, providing educational information on aquaculture and fisheries, games, a tilapia cook book, and more.

*...Earth Fair continued on page 9*

Fish Farming International has recognized Charles Ngugi, AquaFish CRSP Host Country Principal Investigator and faculty members at Moi University, for his contributions to the development of the aquaculture industry in Kenya. "Kenya University Moves Industry Forward" Fish Farming International, April 2009. pp. 32-33. [www.fishfarminginternational.com](http://www.fishfarminginternational.com)

Congratulations to **Claude Boyd**, who received the Distinguished Lifetime Achievement Award and to **Kwamena Quagraine**, who received the Distinguished Early Career Award in US Aquaculture from the US Aquaculture Society at the Aquaculture America 2009 Conference in Seattle.



Kwamena Quagraine  
(Lisa Reifke)



Claude Boyd receives his award from  
USAS President Rebecca Lochmann.  
(Max Mayeaux, USDA)

In addition to an article recently published in *Bioscience* (NOP 09-247 page 9), AquaFish CRSP Lead US PI **Jim Diana** has also contributed to two other publications on the potential benefits of sustainable aquaculture. Both Publications can be accessed online:

LaCarpa, V. "Aquaculture Benefits High, if Practiced Sustainably." **Voice of America**, 12 January 2009.

[www.voanews.com/english/archive/2009-01/2009-01-12-voa44.cfm](http://www.voanews.com/english/archive/2009-01/2009-01-12-voa44.cfm) (Podcast also available)

Cressey, D. "Future Fish". **Nature**, 458: 398-400 (2009).

[www.nature.com/news/2009/090325/full/458398a.html](http://www.nature.com/news/2009/090325/full/458398a.html)



## WORKSHOPS AND TRAININGS UNDERWAY IN MALI

Optimism and expectations have soared in the aquaculture and fisheries industry in Mali following recent February 2009 trainings and workshops held there by the AquaFish CRSP Mali Project, Aquatic Resource Use and Conservation for Sustainable Freshwater Aquaculture and Fisheries in Mali. Prior to the trainings, news of the events was broadcast on national television and over the radio. On the first day of the trainings the Minister of Livestock and Fisheries in Mali opened the first workshop and attended an official luncheon. A number of other government officials also attended. The television and radio advertisements and the opening ceremonies generated a nationwide awareness and enthusiasm for the project.



*A cast net is used to sample a pond at the DNP (Direction Nationale de la Pêche) station below the dam at Lake Sélingué. (Jim Bowman)*

The Project's first training session was held outside Mali in Shanghai, China in 2008 addressing Theme II, "Promoting Sustainable Rice-Fish Culture in Irrigated Systems," but the February trainings were the first to occur in Mali. Addressing the remaining two primary themes —"Advancing the freshwater aquaculture practices and technologies" (Theme I), and "Building community and consensus towards a fisheries management plan" (Theme III)— these CRSP trainings in Mali were a great success.

The Theme I training on pond construction and management took place in the capital city of Bamako and was led by Charles Ngugi, CRSP HCPI from Kenya. This workshop was



*Fish captured in Lake Sélingué are transferred from primarily male fishermen to the primarily female fish sellers at the Carrière landing site. (Jim Bowman)*

originally planned to include 17 fish farmers, but enthusiasm and demand were so high that it was expanded to accommodate more participants, including five from the Regional Fisheries Directorates in Bamako and Koulikoro. In addition to training posters, Ngugi used several different topical training modules to accommodate a range of learning styles. Key topics covered included aquaculture planning, pond site selection, fish species selection, hatchery management, water quality management, and fish farming economics and marketing.

Peter Nzungi, also from Kenya, led the Theme III training, on behalf of Theme III leader Nancy Gitonga. This session took place at Lake Sélingué, where Peter trained both a group of supervisors and a group of enumerators on how to conduct a frame survey in two two-day sessions. Following the training sessions, Peter led the participants of

*...Mali continued on page 6*



*Dr. Charles Ngugi, of Kenya's Moi University, demonstrates practical surveying techniques to participants in the first Theme I workshop in Bamako, February 2009. (Jim Bowman)*

## GRADUATE STUDENT PROFILE: MR. RAVI LAL SHARMAN

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In November of 2008, Nepalese student Mr. Ravi Lal Sharman successfully completed his Master's degree in aquaculture from the Institute of Agriculture and Animal Sciences (IAAS) at the Rampur campus in Chitwan, Nepal. Having been inspired by AquaFish CRSP Project Leader Dr. Madhav Kumar Shrestha, Ravi decided to work on an AquaFish CRSP project looking at polyculture systems involving sahar and mixed-sex Nile tilapia. Ravi's thesis work, which started in 2007, specifically investigated the "Effect of sahar (*Tor putitora*) stocking on recruitment control, growth and production of mixed-sex Nile tilapia (*Oreochromis niloticus*) under a pond culture system."

It has become clear to Ravi that Nepal has great potential for aquaculture development. The country has vast amounts of natural water resources, a great diversity of high-value indigenous fish species, thousands of hectares of irrigated land, man-made ponds, and numerous wetlands and ditches. If these resources can be properly exploited and made productive through aquaculture, the benefit could be great for the country on many levels. However, Nepal currently lacks a number of essential elements for sustainable aquaculture development, preventing the full realization of their potential in this sector. The research of Ravi's major professor, Dr. Shrestha, incorporates Ravi's thesis work into the overall scope of the project to ultimately develop a polyculture system for sahar and Nile tilapia. Sahar is a very popular, high-value indigenous game fish in Nepal, whose numbers are currently declining due to fishing pressures.

Nile tilapia is the most important freshwater aquaculture species in Nepal. The polyculture system under development would use the sahar, which becomes piscivorous in high densities, to provide a production control method on the prolific breeding tendencies of mixed-sex Nile tilapia cultures. Culturing the two fish together would not only functionally improve the tilapia culture process, but would also supply an



*Mr. Ravi Lal Sharman working in the field.*

additional fish product for sale. Offering an alternative to the typical monoculture of mixed-sex Nile tilapia, this system has the potential not only to spur a whole new industry of small-scale culturists in Nepal, but could also help reduce fishing pressure on the already stressed wild sahar stocks.

Prior to his involvement with this AquaFish CRSP research, Ravi earned his bachelor's degree in agriculture from IAAS, where he received the Nepal Animal Science Association (NASA) Scholarship in 1996. The scholarship was in recognition of excellent performance in the Livestock Production and Management elective under the Department of Animal Science. After completing his Bachelor's degree in 1997, Ravi worked seven and a half years on a number of fishery development programs as a Fisheries Development Officer with the Directorate of Fisheries Development in the Nepalese Department of Agriculture. His primary responsibilities were in fisheries program planning, fisheries technology extension, program supervision and monitoring, fisheries technology verification, and fish seed production.

Having now completed his Master's program at IAAS, Ravi plans to return to his duties as a Fisheries Development Officer until he can secure funding for his PhD. He hopes to apply his new knowledge of aquaculture for the benefit of Nepalese fish farmers. Ravi hopes to inspire others like himself to continue following their interests and achieving their goals.





...Seattle continued from page 1

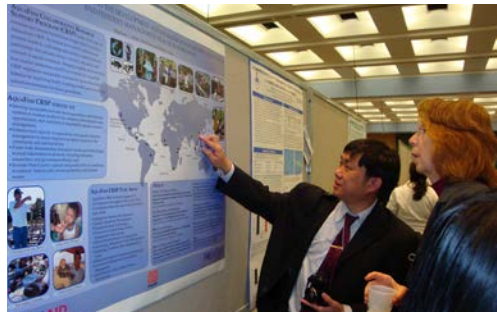
In the days after the meeting, AquaFish CRSP researchers presented on a variety of topics during AA09 at the Seattle Convention Center. On Monday, 16 February, Dr. Eгна chaired a session titled "International Aquaculture Development for the Poor." The well attended session included eleven AquaFish CRSP presentations covering a range of topics. Conference participants then gathered for the evening poster viewing session. AquaFish CRSP displayed two program posters representing a broad view of the research being done throughout the program and an in depth look at the progress of the AquaFish Mali Project. Subsequent AA09 conference activities offered exposure to a wide range of aquaculture research and provided a number of opportunities for meeting and discussion among all participants.



AquaFish CRSP Director, Hillary Egna leads the discussion at the Seattle AquaFish Annual Meeting on 15 February. (Ford Evans)



Jim Diana presents on "Outreach, Acceptance, and Success of Pond Aquaculture in Promoting Rural Economy and Social Stability" during the "International Aquaculture Development for the Poor" session at AA09. (Laura Morrison)



Left: So Nam and Laura Morrison discuss the AquaFish CRSP poster at the AA09 poster session on 16 February 2009. (Stephanie Ichien)  
Center: AquaFish CRSP researchers at the AA09 poster session on 16 February 2009. From left to right Le Xuan Sinh, So Nam, Sebastian Chenyambuga, Maria Célia Portella, Prum Somany, and Tran Thi Thanh Hien (Lisa Reifke)  
Right: From left to right: Lisa Reifke, Jim Bowman, and Charles Ngugi discuss the AquaFish CRSP Mali Project Poster at the AA09 poster session on 16 February. (Stephanie Ichien)

## POSTPONED: WORLD AQUACULTURE 2009 CONFERENCE IN VERACRUZ, MEXICO

Due to the of the recent swine flu outbreak in Mexico, the World Aquaculture Society decided to postpone the upcoming World Aquaculture 2009 conference in Veracruz, Mexico. WAS has worked with its partners and the conference sponsors to reschedule the event

to take place **25-29 September 2009** instead of the previously scheduled dates on 25-29 May. Revised schedules and other information are available on the WAS website. [www.WAS.org](http://www.WAS.org)



...Mali continued from page 3

both groups through an actual survey of the lake. The survey consisted of analyzing the fishing sites and fishing activities through the use of questionnaires distributed and filled out at two primary landing sites on the lake.

Both the Theme I and Theme III trainings were a great success, having imparted knowledge about basic aquaculture and fisheries management techniques and shed light on the potential for the growing industry in Mali. Two years ago, the Direction Nationale de la Pêche created the Fish Farmers Association in Mali, which meets frequently to discuss opportunities and challenges in their industry. However, this is the first time that these kinds of workshops have occurred in Mali in the aquaculture and fisheries sector. Promise of continuing the forward momentum of the project is high, as there is great confidence that the successful delivery of information will enhance the participants' abilities to effectively apply and share their new skills.



Participants take a moment to pose for a photo with workshop leader Dr. Ngugi during the Theme I workshop in February. (Courtesy of Charles Ngugi)

Following the February trainings, the Mali Project team met in Seattle, following the AquaFish CRSP Annual Meeting to discuss the project activities to date and ways to move forward. The next steps will include finding ways to apply the new tools and knowledge to produce tangible results. Each theme has a series of trainings and workshops set to take place over the course of the project with continuous monitoring, evaluating and collaborating to ensure success.

## Notices of Publication

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

### SOCIAL, ECONOMIC, AND PRODUCTION CHARACTERISTICS OF GIANT RIVER PRAWN *MACROBRACHIUM ROSENBERGII* CULTURE IN THAILAND (09-246)

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The objective of this study was to review the state of grow-out production for giant river prawns (*Macrobrachium rosenbergii*) in Thailand, assess the perceived ecological impacts of the industry, and suggest avenues by which farmers might adopt more environmentally sound culture systems. A socioeconomic and technical survey of 100 prawn farmers was conducted during 1 May to 31 July 2005 in Thailand. The majority of respondents were male (70%) and average age was  $46 \pm 1$ . Most farmers (77%) had completed an elementary level of schooling (4 years) and experience on the farm as owner, manager, or both averaged  $10 \pm 1$  years. Most respondents (92.9%) obtained information about prawn culture from their neighbors and only 19% received formal training. Monoculture was the dominant system (96%) while remaining farmers utilized polyculture with prawns and white shrimp (*Litopenaeus vannamei*). The most common management strategy included a 30–60 day nursery phase for postlarvae and harvesting with the combined method, culling only the largest market-sized individuals beginning at 5 months followed by every 30 to 45 days (66%). Culture practices at the time of this survey are best described as

...NOPs Continued on page 7



## ...NOTICES OF PUBLICATION, CONTINUED

intensive. Most farmers stocked at densities below 20 pieces  $m^{-2}$  and average production was 2338 kg  $ha^{-1} yr^{-1}$ , values typically described as semi-intensive. However, some farmers utilized higher stocking densities and obtained production values above those described as semi-intensive. Additional intensive practices were common, including the use of commercially produced feed, frequent water exchange, aeration, and lime and dolomite application. After the culture period water was generally discharged directly into canals without treatment. Average net profits were 3918 US\$  $ha^{-1} yr^{-1}$ . The major problems identified were seed supply (67%), disease outbreak (64%), and external pollution (37%). External pollution was reported to have severe impacts on 16%, moderate impact on 46%, and no impact on 38% of farms. Pollution sources were identified as agriculture (75.4%), aquaculture (39.3%), and industrial and domestic waste (27.9% each). At the time of this survey the giant river prawn industry in Thailand was valued at US\$79,096,000 and ranked third globally behind China and India. To maintain this level of production, research on alternative practices is necessary to balance adequate environmental benefits and economic returns similar to or better than the current monoculture system. Two avenues to transition to these practices include augmenting existing certification programs and community training sessions to introduce best culture practices and provide a venue for farmers to plan local water supply management.

This Abstract was excerpted from the original paper, which was published in *Aquaculture* 287 (2009)

### AQUACULTURE PRODUCTION AND BIODIVERSITY CONSERVATION (09-247)

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This overview examines the status and trends of seafood production, and the positive and

negative impacts of aquaculture on biodiversity conservation. Capture fisheries have been stabilized at about 90 million metric tons since the late 1980s, whereas aquaculture increased from 12 metric tons in 1985 to 45 metric tons by 2004. Aquaculture includes species at any trophic level that are grown for domestic consumption or export. Aquaculture has some positive impacts on biodiversity; for example, cultured seafood can reduce pressure on overexploited wild stocks, stocked organisms may enhance depleted stocks, aquaculture often boosts natural production and species diversity, and employment in aquaculture may replace more destructive resource uses. On the negative side, species that escape from aquaculture can become invasive in areas where they are non-native, effluents from aquaculture can cause eutrophication, ecologically sensitive land may be converted for aquaculture use, aquaculture species may consume increasingly scarce fish meal, and aquaculture species may transmit diseases to wild fish. Most likely, aquaculture will continue to grow at significant rates through 2025, and will remain the most rapidly increasing food production system.

This Abstract was excerpted from the original paper, which was published in *BioScience* Vol. 59 No. 1 January 2009

### COMPARISONS OF GROWTH AND ECONOMIC PERFORMANCE AMONG MONOSEX AND MIXED- SEX CULTURE OF REDMUD CRAB (*SCYLLA OLIVACEA* HERBST, 1796) IN BAMBOO PENS IN THE TIDAL FLATS OF MANGROVE FORESTS, BANGLADESH (09-248)

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## ...NOTICES OF PUBLICATION, CONTINUED

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An experiment was conducted in a randomized block design to compare growth and economic performance between monosex and mixed-sex culture of red mud crab (*Scylla olivacea* Herbst, 1796) fed with trash fish at 5% body weight per day in the mangrove tidal flat at Buriganga Union of Satkhira District, Bangladesh. The experiment had three treatments in triplicate each: (a) all-male culture, (b) all-female culture and (c) mixed-sex culture. Crabs of 80-120 g in size were stocked at a density of 0.5 crab m<sup>-2</sup> and cultured for 100 days. Specific growth rates (SGRs) by weight and internal carapace width (ICW) in the all-male culture were significantly higher than those in the all-female culture ( $P < 0.05$ ), while SGRs in the mixed-sex culture showed no significant differences from those in the all-male and all-female culture ( $P > 0.05$ ). No significant differences in final mean body weight, ICW, daily weight gain, survival rate, gross and net yields were found among all the treatments ( $P > 0.05$ ). The area of high water level with mangroves gave significantly better results in terms of feed conversion ratio, survival rate, gross and net yields than the area of low water level ( $P < 0.05$ ). The experiment suggests that the all-female culture in the area of high water level with mangroves could be suitable in developing commercial pen culture of red mud crabs in Bangladesh.

This Abstract was excerpted from the original paper, which was published in *Aquaculture Research*, 40, 473-485 2009

### GROWTH, FAT CONTENT AND FATTY ACID PROFILE OF SOUTH AMERICAN CATFISH, SURUBIM (*PSEUDOPLATYSTOMA FASCIATUM*) JUVENILES FED LIVE, COMMERCIAL AND FORMULATED DIETS (09-249)

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South American catfish, barred surubim (*Pseudoplatystoma fasciatum*) juveniles (117.6  $\pm$  11.8 mg individual weight; 28.3  $\pm$  2.5 mm total length) were fed various diets: one live (Tubifex worms), two commercial (Aglo Norse and Bio Kyowa), and one semi-purified formulated diet (75% peptide based protein) over a 2-week period. Fish fed the Aglo Norse diet showed the highest growth performance, but cannibalism also was very high (42%). Fish fed peptide based formulated diet demonstrated the lowest growth rate, with no cannibalism. The highest survival was achieved with fish fed Tubifex worms (100%). Lipid level in the whole body of the fish fed four different experimental diets did not differ significantly, averaging 3.6  $\pm$  0.7%. Fatty acid composition of neutral and phospholipid fractions of whole body lipids of fish reflected the fatty acid composition of the diets. The high level of 20:4n-6 in Tubifex worms resulted in a high level of this fatty acid in the tissue of fish fed this diet. It remains uncertain how high survival and no cannibalism is related to dietary lipids/fatty acids. In all cases, the increasing ratio of n-3 HUFA (highly unsaturated fatty acids)/n-6 HUFA in phospholipid fractions suggested the elongation and desaturation of 18:3n-3 to 22:6n-3 via 20:5n-3. Moreover, in respect to the 20:4n-6 levels in the diets, an increase in the concentration of this fatty acid in phospholipid fraction suggests that South American catfish can transform linoleate into arachidonate.

This Abstract was excerpted from the original paper, which was published in the *Journal of Applied Ichthyology*, 25, 73-78, 2009





## Upcoming Meetings and Events...

The AquaFish CRSP is proud to support workshops and meetings designed to facilitate increased knowledge and communication in aquaculture. Upcoming meetings and workshops include...

### World Aquaculture 2009

25-29 September 2009

Veracruz, Mexico

[www.was.org/WasMeetings/meetings/Default.aspx?code=WA2009](http://www.was.org/WasMeetings/meetings/Default.aspx?code=WA2009)



### Asian-Pacific Aquaculture 2009

3-6 November 2009

Kuala Lumpur, Malaysia

[www.was.org/WasMeetings/meetings/Default.aspx?code=AP2009](http://www.was.org/WasMeetings/meetings/Default.aspx?code=AP2009)

### International Symposium on Aquaculture & Fisheries Education

27-30 November 2009

Asian Institute of Technology

Bangkok, Thailand

[www.aarm-asialink.info/isafe-2009.pdf](http://www.aarm-asialink.info/isafe-2009.pdf)

### Aquaculture 2010

1-5 March 2010

San Diego, California

[www.was.org/WasMeetings/meetings/Default.aspx?code=AQ2010](http://www.was.org/WasMeetings/meetings/Default.aspx?code=AQ2010)

### 9th International Symposium on Tilapia in Aquaculture (ISTA9)

15-19 October, 2010

Shanghai Ocean University

Shanghai, China

For more meeting and employment opportunities visit our Education & Employment Opportunities network database online, EdOpNet, at [aquafishcrsp.oregonstate.edu/edop.php](http://aquafishcrsp.oregonstate.edu/edop.php)

## PONDERINGS...

### *Song for the Blue Ocean: The Far Pacific*

"Let us drift among those fishes. They dart and flutter, they graze and munch, they confuse us with color and dazzle us with fabulous forms. Why such an explosion of fishes, so brilliantly adorned in pattern, so famously varied in contour? No one knows. Sharp minds have blunted themselves on the question of why or how there came to be such profusion of fishes on coral reefs — nearly 40 percent of all the world's fish species. Maybe the secret is the tropics themselves. Safe from the periodic deep-freeze ravages of ice ages, tropical evolution can run like a trip meter that never gets reset to zero, endlessly branching in bewildering variation."

Excerpted from Carl Safina's "Song for the Blue Ocean: Encounters Along the World's Coasts and Beneath the Seas" (page 306)  
Published by Macmillan, 1999



...Earth Fair continued from page 2



Top: Two OSU students check out the tilapia at the AquaFish CRSP booth, which also provided the Earth Fair attendees with program information, a sustainable seafoods game, and a Plinko game with the opportunity to win fish related prizes. Rob Chitwood (OSU Smith Farm Genetics & Performance Lab) provided the live tilapia. Bottom: AquaFish CRSP staff and students gather in front of the booth just before the fair for a photo. From left to right: Ford Evans, Jim Bowman, Lisa Reifke, Stephanie Ichien, and Sarah Ing. (Dwight Brimley)



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Your comments, stories, student profiles, and photos are always welcome! Send information to [aquafish@oregonstate.edu](mailto:aquafish@oregonstate.edu) (please include "Aquanews" in the subject line).

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