

SEAFDEC AQD Matters

In-house newsletter of the SEAFDEC Aquaculture Department, Tigbauan, Iloilo

SEAFDEC Council meets in Lao PDR

By B Acosta

On April 5-9, the SEAFDEC Council which represents the 11 member countries held its yearly meeting in Luang Prabang, Lao PDR, to discuss fisheries issues and programs; and the center's progress, plans and management.

The meeting was also attended by representatives of the SEAFDEC Secretariat and Departments, international/regional organizations such as ASEAN, Colombo Plan, Food and Agriculture Organization of the United Nations Regional Office for Asia and Pacific (FAO/RAP), and the Mekong River Commission.

It was hosted by the Ministry of Agriculture and Forestry of

Fisheries Consultative Forum and ASEAN-SEAFDEC Fisheries Working Group Meeting. It is also one of the key cluster areas to be led by the Philippines

- SEAFDEC to conduct activities related to the conservation, management and rehabilitation of mangroves such as mangrove-friendly aquaculture. SEAFDEC can collaborate with coastal area management and forestry-related agencies
- SEAFDEC to develop the technical certification guidelines for cultured shrimp that is consistent with the FAO's own technical guidelines and the ASEAN shrimp GAP (good aquaculture practices)

- SEAFDEC to continue developing human resources at the local level considering that most of the member countries' decentralization policies has shifted the focus to local management of resources

Concerning AQD, the SEAFDEC Council welcomed the reappointment of AQD Chief Dr. Joebert Toledo for another two years effective April 2010. It also recognized the accomplishments of AQD, including its efforts in building the capacity of ASEAN member countries. In particular, AQD's technical assistance to Myanmar on seed production and culture of mud crab was very much appreciated considering that crab culture is an important livelihood of the people.

The Council also suggested that AQD explore the development of aquaculture technologies for new species with economic potential; and develop guidelines on the proper use of chemicals in aquaculture, taking into consideration the outcomes of a workshop organized by Malaysia.

Two member countries had specific requests for AQD – capacity building on aquatic animal health (Vietnam) and freshwater aquaculture & inland fisheries management (Lao PDR).



The participants in this year's 42nd meeting of the SEAFDEC Council. AQD Chief Dr. JD Toledo; Deputy Chief Dr. T Azuma; and Special Departmental Coordinator Ms. B Acosta represented AQD

Lao PDR and chaired by the Council Director for Lao PDR, Mr. Bounkhuang Khambounheuang, who was also elected chair of the SEAFDEC Council for 2010-2011.

The Council directed SEAFDEC as a whole to consider the following in the future:

- SEAFDEC and partners to enhance their efforts in developing adaptive measures to mitigate the impacts of climate change on marine & inland fisheries and aquaculture. This topic will be included in the upcoming ASEAN



The next meeting of the SEAFDEC Council will be held in 2011 in Malaysia.

AQD Chief serves third term



Dr. Joebert Toledo was reappointed as AQD Chief for the third consecutive time. This was announced in Lao PDR during the 42nd SEAFDEC Council Meeting in early April. The trust given to Dr. Toledo is in recognition of the progress in aquaculture R&D that

AQD has made upon his leadership.

Among the institutional landmarks in his term are the significant increase in the number of AQD's foreign and local partners, and the increase in the number of researchers/scientists that have joined AQD and are now working on sustaining aquaculture in view of climate change and other environment issues.

Dr. Toledo has also successfully lobbied for the 50% increase in budget allocation from the Philippine government. Aquaculture continues to be an important government strategy for food security and poverty alleviation especially in rural areas, and AQD plays a significant role in realizing this strategy by developing and refining science-based aquaculture technologies.

Dr. Toledo has also assisted the fisherfolk in Guimaras get back on their feet after the 2006 oil spill through a milkfish cage culture livelihood project with Petron Foundation, Citi Foundation and Guimaras LGU. It has collaborated with SEAFDEC member-countries in a human resource development project funded by the Japan-ASEAN Solidarity Fund of the ASEAN Foundation; and for the Philippines, abalone culture was made the focus of training and extension. There is now a new small-scale abalone and multi-species marine fish hatchery, which demonstrates to the private sector such a profitable venture. AQD also collaborates with the DA-BFAR in a national abalone breeding and culture program.

Dr. Toledo also spearheaded the strategic change in institutional direction, and through a technical experts consultation in Southeast Asia, it was determined that the priority for aquaculture R&D should be small-scale, integrated farms because farmers play a pivotal role in the food supply chain and have better control over the sustainable use of farm resources. AQD is also primed to go into what scientists call "multi-trophic" aquaculture where fish, abalone, sea cucumber, and seaweeds, among others, can be grown simultaneously in a culture system to maximize resource use, minimize pollution in aquatic environments, and perhaps deal with climate change.

Recently, Dr. Toledo was awarded the 2009 *Outstanding Professional of the Year* (Fisheries Technologist) by the Professional Regulation Commission (PRC).



Above: Ms. Betty Lua, AQD Chief Dr. Joebert Toledo, and Mr. Fortunato Sanchez Jr. sign the closure agreement (seated, 3rd to 5th from left, respectively) as witnessed by the Lua family members. At right is the family farm in Cebu



Closure ceremony for ABOT clients in Cebu

AQD Chief Dr. Joebert Toledo signed the closure agreement with ABOT clients Ms. Betty Lua and Mr. Fortunato Sanchez Jr. on April 27 in their milkfish farm in Cebu City. The ABOT Aquanegosyo program is AQD's technology transfer mechanism for fish farmers and investors by preparing business packages and providing technical assistance.

The farm has a total area of 80 ha, but only 34 ha were developed for milkfish culture by AQD. It has several transition ponds, as well as seven nursery ponds measuring 60 x 30 m. Harvest of milkfish increased annually, from 2 tons in 2007, 8 tons in 2008, and 36 tons in 2009. Ms. Lua's goal is to get a production of 100 tons per year from all 80 ha.

Before milkfish culture, pompano, seabass, and *sugpo* were cultured. However, these high-value species were hard to sell because of low demand in Cebu. Thus, Ms. Lua and Mr. Sanchez shifted to milkfish which has a large market in Cebu. The fish catch from their farm were sold in Pasil fish port, which in turn sells to restaurants and local markets. They hoped to eventually have a fish processing plant for producing dried *bangus*, or sell deboned *bangus*.

Ms. Lua said she was "very thankful that at least SEAFDEC is open to sharing with us their technology" and "giving us a chance to develop and fully utilize the area."

First harvest of sandfish juveniles from new hatchery

More than a month after AQD inaugurated its new sandfish or sea cucumber (*Holothuria scabra*) hatchery, the first harvest of an estimated 5,000 juveniles was realized.

“This is a welcome development for the industry because sandfish is highly priced in the export market,” said AQD Chief Dr. JD Toledo. “And, AQD now has the facility to demonstrate its sandfish hatchery technology.”

The juveniles are now used by AQD researchers in nursery rearing studies in hapa nets, or stocked in the integrated wastewater treatment tank to test the potential of sandfish as bioremediator. There are also plans to culture sandfish in multi-trophic systems so they can clean up wastes in shrimp, milkfish and abalone farms, as well as conduct community-managed sandfish stock enhancement program.

“AQD thanks its partner-institutions which aided in developing science-based technologies for sandfish, such as the Research Institute for Aquaculture No. 3 (RIA-3) of Vietnam, the Australian Center for International Agricultural Research (ACIAR) through the Malaysia-based WorldFish Center (WFC), Japan International Research Center for Agricultural Sciences (JIRCAS), the Government of Japan Trust Fund (GOJ-TF) and the University of the Philippines Visayas,” the Chief added.

“RIA-3 helped in designing the hatchery, while ACIAR/WFC and JIRCAS, along with the GOJ-TF, provided financial support for sandfish studies currently being conducted in AQD. In addition, the Department of Science and Technology has been instrumental in technology development.”

April 28 hatchery inauguration:

Ceremonially opening the new AQD sandfish hatchery are (from left to right): AQD Deputy Chief Dr. Teruo Azuma, JIRCAS visiting scientist Dr. Satoshi Watanabe, AQD Chief Dr. Joebert Toledo, Dr. David Mills of ACIAR/WFC, and Mr. Nguyen Dinh Quang Duy of RIA-3. The hatchery can produce as many as 0.2 to 0.5 million sandfish juveniles in a 45-day cycle from its ten 3-ton larval rearing tanks and four 8-ton nursery tanks. At present, it has about 100 sandfish broodstock



June 7 sandfish harvest: AQD staff prepare hapa net to receive the harvested sandfish (A); the net is lined inside the nursery tanks (B, C); 2-5 cm sandfish juveniles are collected using soft paintbrush (D); sandfish is indicated by arrow in E



PHOTO COURTESY OF J ZARATE



The collaborating partners with AQD staff during the hatchery inauguration

AQD assists in HRD training in Vietnam

A total of 17 participants completed the *Human resources development (HRD) on-site training on rural aquaculture* conducted on March 8-11 in Hai Phong City, Vietnam.

The course was a part of the training series being conducted by SEAFDEC in eight member countries under the project *HRD*

on poverty alleviation and food security by fisheries intervention in the ASEAN region. The course is funded by ASEAN Foundation.

AQD Associate Scientist Dr. Nerissa Salayo and Training Officer Ms. Ruby Bombeo gave technical and logistical assistance during the training which was designed by Ms. Chau Thi Tuyet Hanh of Vietnam's Ministry of Agriculture and Rural Development (MARD). The course was organized to help fish farmers find livelihood options and train them in small-scale culture of new species capable of living in deteriorating aquatic environment.

In the first half of the training, topics covered include responsible aquaculture practices & food safety, sustainable rural aquaculture, and issues and concerns in peri-urban aquaculture. In the second half

of the training, shrimp culture and alternative livelihood options were discussed. Fish farmers said they prefer the shrimps *Penaeus monodon* or *P. vannamei* culture due to high economic return, but production cost and disease problems are major constraints. The fish farmers also expressed interest in new species such as cá bớp, also known as sleeper fish or goby in Vietnam, for culture in low-quality water. Cá bớp also has a high market price in Hai Phong City.

The participants also made two field visits, one to a small-scale brackishwater farm presently culturing cá bớp, and another to a fish processing facility in Hai Thanh commune where drying of marine fishes (mackerel or tuna) was presented as a livelihood option.

According to the participants, the training was generally satisfactory. However, a specialized technical training on shrimp and fish culture, and fish disease prevention & control was needed.



Clockwise: Trainees visit a cá bớp fish farm; cá bớp or sleeper fish; the participants during the closing ceremony

A special course in Myanmar

In Chaung Tha, Myanmar where the *On-site course on mud crab seed production* was conducted March 23-25, 17 government fisheries workers attended.

AQD's Breeding & Seed Production Section Head Dr. Emilia Quinitio shared her knowledge on mud crab biology. The discussion focused

on *Scylla olivacea*, the most common crab species in Myanmar. The participants said that larval survival rate is very low, and the major problem is the lack of rotifers for the early zoea stage.

The training also included lectures on broodstock/ larval rearing, and practical demonstrations on morphology

and evaluation of broodstock maturity & egg quality.

The training was sponsored by Myanmar's Department of Fisheries (DOF) and the Government of Japan. Dr. Quinitio had an opportunity to call on the DOF Director-General Mr. Khin Ko Lay and other officers, as well as visit DOF freshwater stations in Pathein and Nuang Tone.

AQD scientist Dr. Emilia Quinitio gives a lecture



Mr. Yè Win Thaug explains the protocol being used in crab seed production. He is a former AQD trainee, and is now in-charge of DOF-Vietnam's crab hatchery

Marine fish training concluded

I made the right choice in coming to AQD," said Ms. Claudia Ehlers Kerber of Brazil upon completing the *International training on marine fish hatchery* which ran from May 26 to July 1.

"This is because of the knowledge imparted unselfishly by AQD mentors and the skills we gained."

Ms. Kerber had 14 co-trainees from the Philippines, Indonesia, Myanmar, Saudi Arabia, South Korea, Sudan,

Thailand, Sultanate of Oman and the Federated States of Micronesia.

Lectures and practicals covered a diverse selection of topics such as sustainable aquaculture, fish biology, natural food production, hatchery design & management, nutrition and feeds, water quality monitoring, health management, economics, post-harvest, and marketing. Aside from the lectures and practicals which were held in Iloilo, the participants also visited the AQD stations in Igang and Dumangas, as well as UPV Miag-ao and several private hatcheries in Iloilo.

On the other hand, Mr. Asaad Hassan Widaa Mohamed of Sudan noted that "AQD must never get tired in giving its best in the quest for excellence."

Gracing the closing ceremony were AQD Deputy Chief Dr. Teruo Azuma, research head Dr. Evelyn Grace Ayson and training & information head Mr. Renato Agbayani.



R. PAGADOR

Clockwise from top left: Trainees identify marine fishes, visit a private farm, inquire about fry production, and prepare a tank for hatchery operation

Acquaintance party

AQD welcomed the trainees of the *International course on marine fish hatchery* in an opening ceremony and dinner party on May 28 at the TID conference room. AQD staff were also present in the party.



Crab hatchery & grow-out course

Six participants coming from Sultanate of Oman, Philippines, and Singapore completed AQD's annual *International training course on crab hatchery and grow-out* that was held April 14–May 5.

AQD resource persons lectured on topics such as seed production, nursery & grow-out and industry status. In addition, the participants had practical demonstrations on microalgae and *Artemia* culture as well as larval rearing and feeding.

AQD Deputy Chief Dr. Teruo Azuma was assisted by mudcrab-shrimp program leader Dr. Fe Estepa and training & information head Mr. Renato Agbayani in distributing the training certificates to the participants.

Dr. Azuma, in his message, said that the course was conducted not only to instruct “how to produce good quality crab seed and how to grow healthy and high-value crabs” but also because there is a “need to disseminate new technology to ensure the sustainability of crab farming through environment-friendly methods.”



Trainee on algae

The sole participant from the Sultanate of Oman, Mr. Mohammed Mudhafar Al-Wahaibi, completed a *Special training course on algal isolation and purification* that was conducted from April 14 to May 5.

The participants and AQD staff during the closing ceremony



CRM training with ZSL

CRM or sustainable coastal resource management is the topic of a training organized by AQD and the Zoological Society of London (ZSL) on two separate occasions — May 26-28 for Capiz and June 16-18 for Aklan and Iloilo — at AQD's Iloilo station.

The training was held in collaboration with the local government units (LGUs) and people's organizations (POs) of Ivisan and Pan-ay, Capiz; Ibajay, Aklan; and Ajuy, Iloilo. This training course was aimed at preparing the participants in making their own CRM plans.

The first session was participated by 36 LGU

personnel and PO members; the second had 30. Lectures included the concept of sustainable CRM, coastal & marine ecosystems, laws & policies related to mangroves and CRM, livelihood & enterprise development, IEC or information-education-communication, shoreline management, coastal tourism, fisheries habitat management, coastal zoning, community organizing, legal arrangement & institutional development, and health & sanitation in coastal areas.

The participants visited the municipality of San Joaquin wherein the LGU of

San Joaquin shared their CRM program.

“Sustainable CRM is an area close to AQD's heart, since this is what we hoped to achieve for the past 37 years,” said AQD Chief Dr. Joebert Toledo during the closing ceremony. He also mentioned that AQD's first CRM project was in Malalison island in Antique. “We would like to see the lessons in Malalison applied by other communities... AQD is willing to provide technical support if the participants wish to engage in livelihood programs in aquaculture as part of their CRM plan.”



ZSL socioeconomic Ms. Josephine Savaris talks about community organizing and CRM planning



AQD scientist Dr. Junemie Lebata-Ramos gives a lecture on coastal and marine ecosystems



AQD's training & information head Mr. Renato Agbayani (left) discusses livelihood enterprise development for the Capiz participants while AQD socioeconomic Ms. Didi Batcados does the same to Aklan-Iloilo participants



AQD's development communication section head Ms. Mila Castañes lectures on information-education-communication

Training on shrimp farming

From 12-28 April, AQD conducted the *Special training on shrimp farming (with emphasis on shrimp health management)* which was attended by six participants, four of whom are staff of the National Prawn Company, Kingdom of Saudi Arabia.

The other trainees came from the Philippines and Sudan. The training course encom-

passed lectures and practicals on various topics such as the shrimp industry; disease detection, prevention, & control; feed preparation; business planning & management; harvest & post-harvest; and site selection & pond preparation. In addition, the participants visited AQD's station in Igang and some privately-owned shrimp hatcheries and farms in Panay.



A trainee examines pathogens during the practical on disease prevention and control

Milkfish post-harvest courses

AQD organized two post-harvest courses for the women of Iloilo and Guimaras provinces.

In the first course, a total of 28 participants from Tigbauan, Iloilo (13 from Buyuan in the first batch and 15 from Parara Norte in the second) took the *Training on post-harvest and marketing of milkfish* organized by AQD on April 16 and 29. The activity is part of a collaborative project with North Carolina State University funded by the AQUAFISH Collaborative Research Support Program.

This training-workshop was aimed at building the women's capability in the proper handling after harvest, value-adding and marketing of milkfish. The participants were taught deboning techniques and marinade preparation.

UP Visayas researcher Ms. Rose Mueda and laboratory assistant Ms. Rosanna Alama were the resource persons.



Clockwise: Participants try their hand at deboning, marinating, and smoking *bangus* (in the middle is Mr. Valencia); *bangus* packaged and ready to be sold

For the second course for Guimaras women, AQD and Taytay sa Kauswagan Inc. (TSKI) joined forces. The training was under the umbrella program on community and enterprise development (CED)

for coastal barangays involved in the Petron milkfish cage project.

The *Smoked processing training* was held in AQD's Igang Marine Station April 15-16. Five fisherfolk each from Igang, San Antonio, Magamay and Santo Domingo attended.

Ms. Kimberly Muzones, TSKI's CED Supervisor, was in charge of the training. The course included deboning, smoking, and costing of milkfish. Mr. Noel Valencia, a small-business entrepreneur from Guimbal, Iloilo, taught smoked processing, while Ms. Raquel Antonio and Mr. Jose Villavicencio, both from the Our Lady of Hope company, taught *bangus* deboning.

AQD station videos

AQD Magic is now complete! The videos of the three AQD stations -- Igang, Dumangas and Binangonan -- have been completed and incorporated in the introductory DVD. Email devcom@seafdec.org.ph for a copy.



AQD attends research workshop in Rizal...

Dr. Maria Rowena Eguia, AQD scientist and OIC of TVDD, delivered a presentation on *AQD 2010 research activities* in San Mateo, Rizal as a participant in the *Workshop on harmonizing fisheries research in the Philippines* organized by BFAR-National Fisheries Research and Development Institute (NFRDI) on March 11.

The other presenters were Ms. Ma. Elena Garces of DA-Bureau of Agricultural Research, Dr. Minerva Olympia of UP Visayas, Dr. Gil Jacinto of UP Marine Science Institute, and Dr. Ulysses Montojo and Dr. Mudjekeewis Santos of NFRDI.

In their presentation, NFRDI said that their aim was to create a databank to

serve as clearing house for all information. They also hoped to determine what other areas of fisheries research can be pursued by NFRDI. A team composed of representatives from the invited research agencies was created by NFRDI to assist them in screening and evaluating proposals that may be funded by the national government and other sources.

...a convention in GenSan...

AQD researchers Mr. Vincent Encena II and Ms. Ma. Rovilla Luhan were invited by the Philippine Department of Agriculture to deliver talks on abalone and seaweed farming, respectively, at the Brunei-Indonesia-Malaysia East Asia Growth Area's (BIMP-EAGA) *High-value aquaculture business conference* held April 5-7 in General Santos City.

AQD also put-up a mini-exhibit in the convention.



Country representatives of BIMP-EAGA

[L-R] AQD presenters Mr. V Encena II and Ms. MR Luhan with Dr. Jose Ingles of World Wildlife Fund



...another one in Bohol...

Organized by Events Quality and Interactive Promotions, Inc. in partnership with BFAR 7 and the Municipality of Calape, the *Aquaculture technology 2010 convention* was held April 6-8 in Panglao, Bohol.

The event included lectures addressing issues affecting the aquaculture sector, a technical tour of the Calapa mariculture park, and an exhibit.

Resource persons from BFAR Region 7, UP Visayas, SanteH Feeds discussed the impact of global warming on aquaculture; aquaculture entrepreneurship & marketing; post-harvest handling; culture of high-value fish, shrimp, oyster and seaweed; and value-added products, among others.



Actor Cesar Montano (right) visited AQD's booth, manned by Mr. Rosenio Pagador

PHOTO COURTESY OF R PAGADOR

...and a science conference in Pasay City

AQD scientist Dr. Ma. Lourdes Aralar attended the *10th Science Council of Asia (SCA) conference* held in Pasay City June 13-16.

The conference included paper presentations on human health and climate change, technology & environment. There was also a workshop on SCA's continuing projects and special sessions on pop culture in Asia and renewable energy.



Participants listen to the speech of DOST Sec. Estrella Alabastro

ML ARALAR

AQD research seminars



Ms. Eleonor Tendencia of AQD's fish health section presented her study entitled *Rainfall and atmospheric temperature affect white spot syndrome virus (WSSV) prevalence* on April 8.

She noted that WSSV has devastated the shrimp industry worldwide, and disease occurrence

has been associated with factors such as pond management techniques and environmental conditions. Because of the observation of shrimp farmers that WSSV infection is more prevalent during the rainy season, she focused her study in this time of the year (2000-2007), and in shrimp farms in Negros.

She found out that low atmospheric temperature is a risk factor in WSSV development in tiger shrimp *Penaeus monodon*. In general, the low atmospheric and water temperatures during the rainy season act as stressors for cultured shrimp, likewise the runoff water from days of continuous rain.



Dr. Michele Nishiguchi from New Mexico State University (USA) gave a presentation on *Deciphering symbiotic conversations: ecological and evolutionary dynamics between a bobtail squid-Vibrio mutualism* on April 15.

Dr. Nishiguchi said that *Vibrio* spp. are ideal for the study

on mutualism because they are bioluminescent, and the light they produce are used by sepiolid squids in counter-illumination, a mechanism which allows squids to evade predators by camouflage. She also discussed the evolutionary framework, biogeography, and adaptation of new *Vibrio* species.

In summary, Dr. Nishiguchi noted that multiple lineages of symbiotic evolution can lead to diversity, that specificity caused by subtle molecular differences among strains may result in bacterial speciation, and that abiotic factors have an important role in shaping host-bacterial interactions.



Dr. Ma. Michelle Peñaranda from the University of Washington (USA) presented her study on *Basis of host-specific virulence of U and M genogroup infectious hematopoietic necrosis virus (IHNV)* on April 19.

She said that host specificity is a phenomenon exhibited by all viruses. For the fish rhabdovirus IHNV, the differential specificity of virus strains from the U and M

genogroups has been established both in field and in experimental challenges.

In this study, M IHNV strains are consistently more prevalent and more virulent than U IHNV in rainbow trout, based on the investigations in live infection challenges. In the analyses of the host immune response, M IHNV-infected fish consistently had

higher and longer expression of innate immune-related genes.

The results suggest that the higher virulence of M IHNV was not due to suppression of immune response in rainbow trout. Taken together, the results support a kinetics hypothesis wherein faster replication enables M IHNV to rapidly achieve a threshold level where the virus overrides the strong host immune response.



Ms. Gladys Ludevese of Ghent University (Belgium) presented a study on *Stable isotope and mineral profile as an estimate of prey preference in two coral species grown in captivity* on April 22.

She tested three diets on two coral species, the gorgonian *Pinnigorgia* sp. and the scleractinian *Stylophora pistillata*.

The first diet contained the highest concentration of two zooplankters and one phytoplankton; the second diet contained half the concentration of zooplankton and 10x less alga than the first diet; the third diet served as the control where there was no live feed input.

The first diet resulted in lower nitrogen isotope values whereas no significant difference was observed

in the other two. All three did not affect the mineral composition of corals. As expected, calcium was higher in *S. pistillata* than in *Pinnigorgia*. However, minerals like Cu, Zn, Mn, Fe, Mg were significantly higher in *Pinnigorgia* sp. suggesting a different mineral requirement compared to *S. pistillata*.



Ms. Ofelia Reyes, AQD's Associate Researcher, presented her paper on the *Influence of dietary protein and lipid levels in the growth, body composition and survival of snub nosed pompano, Trachinotus blochii juveniles reared in cages* on April 29.

Pompano juveniles with initial body weight of 2.8 - 3.5 g and body length of 4.4 - 4.71 cm were stocked in 2 x 2 x 1 m net cages. Nine diets were formulated to contain three protein levels (380, 420, 460 g per kg) and three lipid levels (120, 160, 240 g per kg) and given for 85 days.

She said that pompano fed diet containing 460 g per kg protein and 120 g per kg lipid had the best weight gain. But there is no significant difference among treatments on the feed conversion ratio, survival and hepatosomatic index.



Mr. Renato Agbayani, AQD's training & information head, presented his study on the *Resiliency of small-holder fish farmers on climate change and market prices in selected communities in the Philippines* on May 6.

The highlights of the study were: (1) high market prices influence schedule of harvest, (2) high mortality of fish stocks result to loss of income and properties, (3) there is a need for policy orientation to improve the

preparedness of small-scale fishers and lessen the negative impact of climate change, and (4) some of the fish farmers seemed ready (=more resilient) for climate change, though some are not.

The occurrences caused by climate change as experienced by small-scale fishers in ICDSA (AQD's institutional capacity development for sustainable aquaculture) sites include flash floods, increased water temperature, stronger waves, and longer dry season.

ICDSA is aimed at empowering stakeholders of coastal resources and help them become responsible stewards of their natural resources. The four on-going ICDSA projects as of April 2010 are culture of mud crab in ponds and mangroves in Northern Samar; tilapia cage culture in Capiz; milkfish cage culture in Guimaras; and grouper cage culture in Misamis Occidental. The project recipients' net gains from demonstration and production runs ranged from 19%-198% of their investments.



Ms. Jocelyn Ladja, head of AQD's demonstration and packaging section presented her paper *Effects of nutrients and light conditions on diatom propagation, refinement of larval and postlarval culture techniques for the abalone Haliotis asinina Linne* on May 13. She co-authored this paper with Ms. Milagros de la Pena.

Navicula sp. (63%) was the dominant species in the mixed diatoms they used, which were cultured on corrugated plastic plates for 50 days.

Ms. Ladja said that mixed diatoms grew better and faster with agricultural fertilizers (21-0-0, 16-20,0 and 46-0-0) at any light condition than with technical grade chemical reagents (sodium nitrate,

disodium hydrogen phosphate, and ferric chloride). *H. asinina* larvae also settled best in abalone mucus-treated diatom plates (diatom density is $>3.9 \times 10^4$ cells per cm^2) when aeration was provided at day 2, day 3 or day 4 and in un-aerated cultures.

Similarly, postlarval survival at metamorphosis at day 30 was best in plates with high-diatom density.



Mr. Joseph Leopoldo Laranja, Associate Researcher assigned at AQD's farming systems & ecology section, presented on May 20 the paper he co-authored with ET Quinitio, MR Catacutan and RM Coloso entitled *Effects of dietary L-tryptophan on the agonistic behavior, growth and survival of juvenile mud crab Scylla serrata*.

Mr. Laranja noted that low mud crab survival during culture can be attributed to aggressive encounters and cannibalism. That's why he

is testing the use of tryptophan (TRP), an essential amino acid for mud crab. TRP is a precursor of 5-HT (5-hydroxytryptamine), a neurotransmitter involved in aggression of crabs. The four treatments were 0.32% TRP in the diet as control; 0.5%, 0.75% and 1% TRP of dry diet. These were fed to mud crab for 4 weeks before the one-hour fight experiments were done.

The intensity and frequency of attacks were both significantly lower in those given diets containing 0.75% and 1%

TRP compared with control. The circulating 5-HT levels in hemolymph before fight were not significantly different among treatments, but, after the fight, 5-HT was significantly higher in TRP-supplemented mud crab compared with control. This suggests that 5-HT plays a role in suppressing crab antagonistic behavior during aggressive encounter. However, growth was reduced in TRP-supplemented groups compared with the control group.



Dr. Celia Pitogo, head of AQD's Fish Health Section, gave a special lecture on the *Introduction to shrimp histopathology* on May 26.

She discussed the different applications of histopath in terms of disease diagnosis; monitoring the effect of feed or feed ingredients; investigating the effect of treatments/pollutants in the water, or toxins found in feeds; monitoring the state of organ development; among others. In terms of disease diagnosis, she explained that it is important to

know the external and internal anatomy of shrimp. She noted that toxic diseases are usually caused by microbes, mold, algal toxins, metabolites, crude oil, insecticides, herbicides and pesticides, heavy metals, strong acids, bases, oxidants and fixatives. These toxicants are readily present in the environment (water, sediment, food), biologically available, and can be bio-accumulated.

She also tackled the different kinds of routine histological methods such as fixation,

dissection, dehydration, sectioning, staining, cover slipping and examination. She emphasized that injecting fixative into live shrimp is a very essential step to preserve and prevent contamination of shrimp tissue samples. She also mentioned that the diseases affecting the integument such as the Taura syndrome virus and white spot syndrome virus are also included in the list of notifiable diseases by the Office International des Epizooties (OIE).



Mr. Eliseo Coniza presented the study on *Growth, yield, survival and economics of mangrove red snapper Lutjanus argentimaculatus fed practical grow-out diets in net cages in pond* on May 27. His co-researchers were MR Catacutan, PA Caballero, DP Tormon and RF Agbayani.

The study was split into two; in the first experiment, snapper juveniles were stocked at 10 per

m² in netcages and fed SEAFDEC diet or commercial diet. After more than 12 months, snapper fed commercially-available feed performed better in terms of growth. Feed conversion ratio, survival rates and condition factors of snapper did not differ between treatments.

In the second experiment, bigger snapper juveniles were stocked in netcages at 6 per m².

Fish were fed modified SEAFDEC-phased diet (starter, grower and finisher) and commercial diet. After 6 months, snapper fed SEAFDEC diet exhibited significantly better growth & total yield, and higher economic efficiency in terms of net income (PhP 252,476), return-on-investment (231%), and payback period (0.41 yrs) compared to fish fed commercially-available feed.



Dr. Teruo Azuma, AQD's Deputy Chief, presented on June 25 his study on *Sex reversal techniques through manipulating environmental temperature in sockeye salmon Oncorhynchus nerka*.

He conducted experimental studies wherein the eyed eggs or

alevins of genetically all-female fish were subjected to high temperatures (14, 16, and 18°C from the basal temperature of 9°C) at different developmental stages and for different durations.

Results showed that sockeye salmon could be safely and simply

sex-reversed by exposing the fish to high temperature ranging 14-18°C at certain stages and durations. The best time to obtain 90% or more sex-reversed males was before hatching, and only a week-long exposure to 18°C was required.

Video shoot @ AQD

The SEAFDEC Secretariat sent Mr. Thaweesak Chanloi, Head of SEAFDEC Training Department's multi-media section, to AQD to film for its updated organizational video. The filming was done April 26-29 and covered AQD's programs and four stations. AQD's development communication staff, who arranged the itinerary and escorted Mr. Thaweesak, thank AQD officials, program leaders and technical assistants for sharing their time and patiently explaining their work. We owe you millions!



J ZARATE



AQD Deputy Chief Dr. Teruo Azuma talks about sustainability



Research head Dr. Evelyn Grace Ayson discusses responsible aquaculture practices to protect the environment and deal with climate change



Breeding & nursery head Dr. Emilia Qunitio shows mud crab larvae reared in the hatchery

AQD Chief Dr. Joebert Toledo gives the overview of AQD programs and collaborative mechanism

Farming systems & ecology head Dr. Junemie Lebata-Ramos explains multi-trophic culture systems and mariculture park sediment-water quality monitoring





Nutrition & feed development head Dr. Mae Catacutan describes the different types of feed, depending on culture species



Marine fish program leader Dr. Relicardo Coloso shows the fish broodstock in the big hatchery and describes the marine fish research priorities



After the interview with Fish health section head Dr. Celia Pitogo, technical assistant Mr. Demy Catedral demonstrates bacterial enumeration of biofilms from abalone plates



Associate researcher Ms. Gregoria Pagador explains while technical assistant Ms. Haydee Rose Dumarán prepares histological slides



Seaweed program leader Ms. Ma. Rovilla Luhan describes the new seaweed strain developed by AQD



Demonstration and packaging section head Ms. Jocelyn Ladja explains the culture of different fishes in Dumangas



Program leader Ms. Milagros de la Peña speaks about natural food for aquatic species



AQD scientist Dr. Rolando Pakingking samples blood of grouper for a serum neutralization assay

Technology verification section head Mr. Rolando Gapasin describes a pond study in Dumangas



Marine fish hatchery in-charge Ms. Ofelia Reyes demonstrates how to collect ripe fish eggs



Biotech in-charge Ms. Margarita Arnaiz demonstrates use of the high performance liquid chromatography



Study leader Mr. Vincent Encena II explains abalone grow-out system, including packing and transport



Prof. Frances Nievaes talks about the sandfish cage culture trial



Study leader Ms. Shelah Buen-Ursua explains the seahorse hatchery and cage culture project



AQD scientist Dr. Edgar Amar explains disease prevention and control of marine species



Senior technician Ms. Bernardita Eullaran and hatchery staff harvest milkfish fry



Senior technical assistant Mr. Nestor Bayona shows abalone broodstock at the new abalone and multi-species marine fish hatchery



Mr. Saad Al Helali of Saudi Arabia is one of the trainees who shared his nice experience at AQD

AQD Matters

is published monthly by the Development Communication Section, SEAFDEC Aquaculture Department, Tigbauan, Iloilo, Philippines

Editors this issue:
BC Baylon, GK Faigani

Editorial consultants:
MT Castañón, RF Agbayani,
2009 Publications Review Committee

Circulation to friends of AQD:
SB Alayon

For contributions and feedback, kindly email:
devcom@seafdec.org.ph