AQUANEWS

Sustainable Aquaculture and Fisheries for a Secure Future

AquaFish Collaborative Research Support Program Newsletter

Volume 24, Number 1/Winter 2009 Contact us at aquafish@oregonstate.edu ISSN 1062-4996

Visit *Aquanews* archives at http://aquafishcrsp.oregonstate.edu/

Tilapia Podcasts Now Available

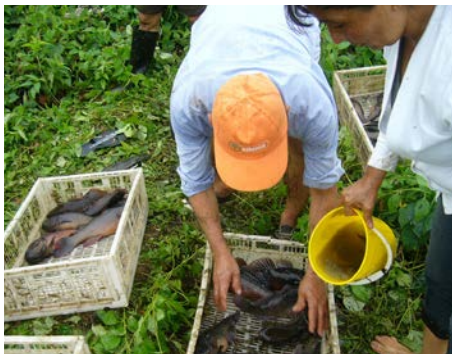
Developed by our colleagues at the National Oceanic and Atmospheric Administration, North Carolina State University, and Central Luzon State University in the Philippines, the Tilapia Podcasts are now available through the AquaFish CRSP website. The podcast series is a development out of the North Carolina State University's "Practical Feeding Strategies" project providing useful information on tilapia aquaculture. Primarily aimed at tilapia farmers, hatchery managers and students in the Philippines, this podcast series

...Podcasts continued on page 11

Chame Seed Project in Ecuador

By Gustavo A. Rodriguez M. de O., Guillermo Rodriguez, Eladio Gaxiola, Rafael Elao and Maria Haws

Aquaculture diversification is nowadays a relevant practice along the Pacific Coast of the Americas. This region includes a magnificent ichthiological biodiversity that has allowed habitants of these areas to consume a variety of locally found fishes as part of their cultural background. In several particular cases, the demand for a species has promoted specific efforts towards production by aquaculture. As an example of this, we cite the pacific fat sleeper *Dormitator latifrons*, a species of interest to AquaFish CRSP researchers in Ecuador.



Fish just harvested form production unit (Rafael Elao)

...Chame continued on page 5.

AquaFish CRSP Photo Contest Winner
So Nam from Cambodia

From our research projects in Cambodia with Lead US institution, University of Connecticut, the winning picture of the first AquaFish CRSP photo contest was submitted by Host Country Principal Investigator, So Nam. The picture depicts the catch of small-sized fish (<25 cm) brought up by a stationary trawl net in the Tonle Sap River. These fish can be sold for a variety of uses including aquaculture development. In Cambodia, at least 62 species of freshwater, small-sized fish are used for feed in inland aquaculture facilities.

...Photo continued on page 8

Goings-on in the Pond...

AquaFish CRSP proudly launches its new website at http://aquafishcrsp.oregonstate.edu/. Here you can find all of our publications, news and events, as well as the he most recent request for proposals. For more on the RFP, see page 3.

Former CRSP graduate student from Oregon State University, under Martin Fitzpatrick's Mexico Project, David Close, was appointed Assistant Professor and Distinguished Science Professor of Aboriginal Fisheries at the University of British Columbia. With a research focus on the lamprey, David is conducting interdisciplinary research in aquatic ecology, fish physiology, chemical ecology and the integration of traditional knowledge and fisheries science.

AquaFish CRSP would like to welcome the new members to the Management office in Corvallis, Oregon. Ford Evans joins us as our new Research Projects Manager, Patty Heublein as our office assistant, and Laura Morrison as our Synthesis Coordinator.

Maria Portella, CRSP researcher submitted two proposals that have recently been approved by CNPq/Brazil. One was from an RFP for working with the Cooperative of Fishfarmers from Santa Fe do Sul and Region. The other was an RFP from ProAfrica looking to increase productivity and sustainability of fish culture in Africa through collaboration with Brazil. Maria states that both built on her participation in the AquaFish CRSP HCPI Exchange Project on Tilapia and Other Cichlids.

The Second Annual Report for AquaFish CRSP is now posted on our website. View it now: Second Annual Report. Also available, the The Collected Abstracts from 1996-2008, compiling abstracts from Aquaculture CRSP and AquaFish CRSP research. View it now: The Collected Abstracts.

Mali Project: Developing Sustainable aquaculture and Fisheries practices

With the population in West Africa projected to grow substantially in coming years, the tremendous pressures on their natural resources must be considered in order to alleviate poverty, ensure food security, and to develop an environmentally sustainable economy. The fishery and aquaculture sectors are a great asset to the national economy in Mali, as they provide for the growing demand locally consumed fish and provide an income for thousands of people. Declining fish stocks is becoming a critical issue in Mali as supply is far from meeting the demands of the local markets. Therefore, increasing aquaculture production and developing sustainable fisheries management are possibly the most promising alternatives to increase the overall supply of aquatic products.

In response to a request for assistance from USAID Mali, AquaFish CRSP is partnering with the Direction Nationale de la Peche (Government of Mali) and collaborators from Moi University in Eldoret, Kenya, Shanghai Ocean University in Shanghai, China, and FishAfrica in Nairobi, Kenya to implement a project for the sustainable development of the aquaculture and fisheries sectors in Mali. The overall goal for the project is to improve the productivity and income of producers through facilitation of access to technologies and to increase the capacity of stakeholders involved in freshwater fishfarming and capture fisheries management in targeted areas of Mali. A team of AquaFish Principal Investigators has identified three major themes to address through a South-South collaboration model in order to meet the goal of the project and to enhance the sustainability of the impacts.

...Mali continued on page 8

Two New Principal Investigators in Guyana and Ecuador

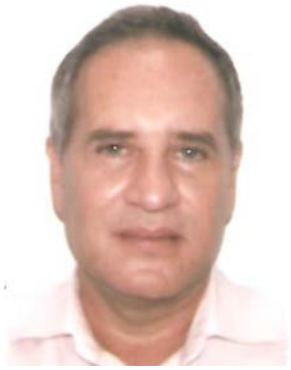
Pamila Ramotar in Guyana

Pamila is a graduate of the University of Guyana and has been with the Department of Fisheries in the Ministry of Agriculture for several years. She has received additional training from several courses and workshops in fisheries and aquaculture at the University of West Indies and at other venues in the Caribbean. Ms Ramotar has worked on both inland and marine fisheries conducting population surveys and gear development. Recently, she was promoted to the aquaculture position, which includes the Directorship of the Mon Repos Aquaculture Center in Guyana where she is conducting research with tilapia, pacu, and native catfishes. Pamila also serves on the Guyana Aquaculture Association working with local producers and suppliers to increase the aquaculture industry.

Pamila in Egypt 2008

Carlos José Rivas Leclair in Nicaragua

Carlos José Rivas Leclair is a graduate in Management of Politics, Programs and Social Projects at the Central American University (UCA), Managua, with a Masters in Environment and Integral Development at the National Technical Institute (TPN) in Mexico. Mr. Rivas Leclair has been named the Director of the Center for Aquatic Research (CIDEA) at UCA where he will aid in continuing AquaFish CRSP research on bivalve culture and shellfish sanitation. Prior to taking this position, Rivas Leclair was the Director of the National Office of Clean Development and Climate Change and has held a number of other highly distinguished positions in Central America over the past 25 years.



Carlos José Rivas Leclair

ISTA8: Tilapia Aquaculture From Pharaohs to the Future

By Kevin Fitzsimmons

The Eighth International Symposium on Tilapia in Aquaculture (ISTA8), co-sponsored by the AquaFish CRSP, was held in Cairo, Egypt 12-14 October, 2008. The event recognized the birthplace of tilapia aquaculture and home of the Nile tilapia on the 25th anniversary of the first ISTA held in Israel in 1983. The Cairo Convention Center was the venue for the conference and provided excellent facilities for simultaneous translations, concurrent sessions, and a trade show. The scope of the ISTA symposia has closely matched the growth of tilapia farming into a global industry of the second most commonly farmed fish in the world. From the first ISTA with several dozen participants, the ISTA's in Brazil, the Philippines, Mexico, and now Egypt have each drawn between 600 and 900 attendees. Hundreds of thousands of jobs have been created in the farming, processing, and selling of almost

...ISTA8 continued on page 6

AquaFish CRSP issues Request for Proposal (RFP)

The Management Entity of AquaFish CRSP issued a request for proposals (RFP) in November 2008, posted on the AquaFish website. The RFP invites proposals for research that aims to solve critical issues faced by global aquaculture development and aquatic resource management in the lower income countries of Africa. Themes addressed by proposals should be inline with the goal of the AquaFish as stated by USAID, to "develop more comprehensive, sustainable, ecological and socially compatible, and economically viable aquaculture systems and innovative fisheries management systems in developing countries that contribute to poverty alleviation and food security." (USAID, May 2006). The RFP closed 5 February 2009. For more information, please find the RFP online at http://aquafishcrsp.oregonstate.edu/rfp.php

BIFAD Visit To Kenya

In late October of 2008, extensive planning and coordination brought members of the Board for International Food and Agriculture Development (BIFAD) management team to Kenya for a two-week field visit. A presidentially appointed committee created in 1975 under the Foreign Assistance Act, BIFAD advises USAID on agriculture development and oversees the nation's Collaborative Research and Support Programs (CRSPs). The team consisted of Robert Easter, Chair of BIFAD and Dean of Agriculture at the University of Illinois, Tim Rabon, BIFAD member and rancher from New Mexico, Joyce Turk, USAID/AG staff, Ron Senykoff, the USAID liaison for BIFAD, and Tag Demmet, Director of the Livestock CRSP from the University of California, Davis. The purpose of the Kenya visit was for the BIFAD team to obtain an in-depth understanding of how CRSPs function and perform in the field in order to help build partnerships with U.S. universities in support of USAID's programs.

One of the AquaFish CRSP's major partners in Kenya, Moi University, was selected by USAID and BIFAD to be included in the tour. Though the BIFAD team was unable to visit the site, Dr. Charles Ngugi, former ACRSP and current AquaFish CRSP Host Country Principal Investigator, was granted time to present to the team at the UN Offices in Nairobi. In his talk, Dr. Ngugi demonstrated how new technologies have impacted the development and management of the aquaculture industry in Kenya dating back to the initial partnership, which began in 1997 under the Pond Dynamics and Aquaculture CRSP (PD/A CRSP). With his long history in CRSP, Dr. Ngugi was also able to highlight the changes that have taken place in our program as it shifts from the ACRSP to the AquaFish CRSP, speaking to some of the AquaFish global themes.

With help from many different sectors and organizations in planning and arranging the detailed itinerary, the Kenya visit was a success for the BIFAD team and everyone involved. BIFAD team members experienced a high level of professionalism, dedication and warm receptions throughout their visit.

From left to right: Timothy Rabon, Hudson Musambu, Charles Ngugi, H. H. Barlow III , Joyce Turk, and Robert Easter at the UN offices in Nairobi following Dr. Ngugi's talk.

Graduate Student Profile: Jeanne Coulibaly

Originally from the city of Abidjan, Côte d'Ivoire, Jeanne Coulibaly is currently pursuing her doctorate degree at Purdue University in Agriculture Economics. Having obtained her undergraduate degree in biology and veterinary medicine from the University of Cocody in her hometown and the School of Veterinary Medicine in Dakar, Senegal, in 2006 Jeanne was awarded a Norman Borlaug LEAP fellowship to investigate dairy cattle and milk marketing in rural Côte d'Ivoire. Carrying this experience with her, she is now investigating "Optimal Marketing Strategies for Fish Famers in Kenya and Ghana" under the AquaFish CRSP. Her major professors at Purdue are Dr. William Masters and CRSP US Lead Principal Investigator, Dr. Kwamena Quagrainie.

In the Côte d'Ivoire, fish represent an integral part of the animal protein diet for a majority of consumers. With increasing pressures on the capture fisheries, fish stocks are rapidly declining and aquaculture is emerging as a sustainable industry for meeting the increasing demand for fish. These realities in the Côte d'Ivoire have drawn Jeanne to aquaculture and have led to her involvement with AquaFish CRSP research.

Jeanne's research focuses on developing the marketing organization of the aquaculture industry in order to

...Jeanne continued on page 7

...Chame continued from page 1

The Pacific Fat Sleeper is a gobidae fish with a geographic range from southern California in the U.S. to northern Peru. Commonly known as chame in Ecuador, popoyote in Central America and southern Mexico and puyeque in northern Mexico, this fish has the potential to rival or replace tilapia as a culture species in the Americas. It is particularly suited for both coastal and wetlands areas. Despite its extensive range, it is only consumed in a few locations in Latin America, primarily in the Province of Manabi in Ecuador, and several locations in Central America and south Mexico.

In previous experiences with chame, this species was targeted for aquaculture development under a "Sustainable Coastal Communities and Ecosystems" (SUCCESS) project sponsored by EGAT/USAID in partnership with the Coastal Resources Center at the University of Rhode Island and the University of Hawaii Hilo with Ecocostas as the Ecuador partner. As a result of the experience from the SUCCESS project, researchers created a handbook, "Proyecto para la Conservación y Desarrollo del Estuario de Cojimíes (Sustainable Coastal Communities and Ecosystem Project -SUCCESS)" edited by Ecocostas. It is available on-line at Ecocostas.org

Chame produced at the AsoMache organization location in Ecuador (Rafael Elao)

Chame has a number of attributes providing for its considerable potential in sustainable aquaculture. The species is euryhaline, it reproduces naturally in ponds, has a high quality flesh, it has omnivorous/detritivorous feeding habits, exhibits rapid growth, is extremely hardy, can survive out of water for up to three days, and is easily sexed for mono-sex culture. Nevertheless, a major constraint on chame production by aquaculture in Ecuador is the fact that all chame stocked into culture units are captured from the wild.

The primary difficulty for the development of chame aquaculture is the current inability to produce juveniles in the laboratory. Thus, most of the research needed for the species should be directed towards understanding the variables involved with the onset of exogenous feeding. In relevant practical experiences from as early as 1982, several Ecuadorian researchers demonstrated that within a few hours after yolk sack absorption, there is a 100% mortality rate for the larvae, given that the onset of exogenous feeding has not been achieved. Other aspects related to reproductive biology, such as gonadal maturation in captivity and the mechanisms of phenotypic sex determination should be addressed as well.

Chame aquaculture is a viable possibility. As positive aspects, feeding requirements and grow-out conditions can be as extensive or intensive as desired depending on the level of production determined by the producer. Showing a satisfactory growth performance, the fish demonstratees low nutritional requirements, easily satisfied using agriculture by-products, organic waste, native aquatic vegetation, and low-cost formulated feeds. Although high-density stocking in pond culture has not been fully tested, heterogeneous growth could be difficult. Nevertheless, given that males seem to have faster growth rates, monosex culture could solve this.

To date, CRSP researcher, Dr. Gustavo Rodriguez, has compiled many references and practical experiences after a visit to Ecuador, outlining the most relevant necessities to contribute to a collaborative effort in chame seed research. A comprehensive effort towards the production of juveniles, as well as other husbandry aspects such as optimal salinity, fish density, and feeding requirements need to be addressed in order to effectively contribute towards the development of chame aquaculture in Latin America.

...ISTA8 continued from page 3

3,000,000 mt of tilapia products per year. This enormous quantity of fish has been produced in many of the world's poorest developing nations, providing high quality seafood to their own people as well as the most highly developed markets. This fact was reflected in the diversity of attendees and presentations from 40 different countries.

The technical sessions included 112 presentations with each presentation having a paper also published in the proceedings. Papers on genetics, nutrition, fish health, processing and food safety, best management practices, marketing and value added products, certification programs, and regional reviews are included in the proceedings. Copies of the ISTA 8 proceedings are available from the World Aquaculture Society on-line bookstore (www.was.org) or from the co-Chairman, Dr. Hussein ElGhobashy helghobashy46@yahoo.com at the Central Laboratory for Aquaculture in Egypt. Most of the papers are in English with Arabic translations of the abstracts, and a few vice-versa. Keynote addresses included Saad Nasser's discussion of the State of Aquaculture in Egypt, Yang Yi's presentation on advances in pond management, Jesse Chappel's review of an integrated tomato and tilapia production system, Kevin Fitzsimmons' market review and description of new products, and description of the VitaFish recirculation system in Belgium by Jooste DeSmed. Other past and present CRSP participants included Remedios Bolivar and three others from CLSU-Philippines, Charles Ngugi, Karen Veverica, Khalid Salie, Chhron Lim, Pablo Gonzalez, Mario Hernandez, and several Egyptians, in addition to Yi and Fitzsimmons.

ISTA 8 conference participants gather for a photograph.

Other aspects of the conference included a Nile dinner cruise with tilapia on the menu to go along with classic Egyptian entertainment and a farm tour to the Egyptian Aquaculture Center, managed by Dr. Ishmail Radwan. The Center provided an extensive tour covering hatchery production, pond harvesting, and packing of fresh fish for Cairo and Alexandria markets. Egypt has become the second largest tilapia producer after China. One of the focal points of ISTA was the steps that are needed for Egypt to become a significant exporter of tilapia products.

Many people also took advantage of open periods to visit the Pyramids of Giza, the Sphinx, the Egyptian Museum, and Luxor where they could observe hieroglyphics of tilapia held in ponds during the Early and Middle Kingdoms of Egyptian history. Lunch and coffee breaks provided opportunities for discussions between delegates to compare results and projects.

Reverend Jan Heijne Award

The Tilapia International Foundation presented their award recognizing exceptional career service in support of poverty alleviation through tilapia aquaculture to Dr. Marc Verdegem from Wageningen University during the Nile dinner cruise. Named for Reverend Heinje, who organized and supported several tilapia farming projects in developing countries with his congregation in the Netherlands, the award is presented at each of the ISTA events. Following tradition, the Ambassador from the Netherlands to the host country, Egypt in this case, presented the award. Dr. Verdegem has a distinguished record of development projects in Africa and Asia along with publications of research conducted in the field and at Wageningen. He also collaborated with the former PD/A CRSP.

Sponsors and Supporters

Egypt's Central Laboratory of Aquaculture Research in the Department of Agriculture and

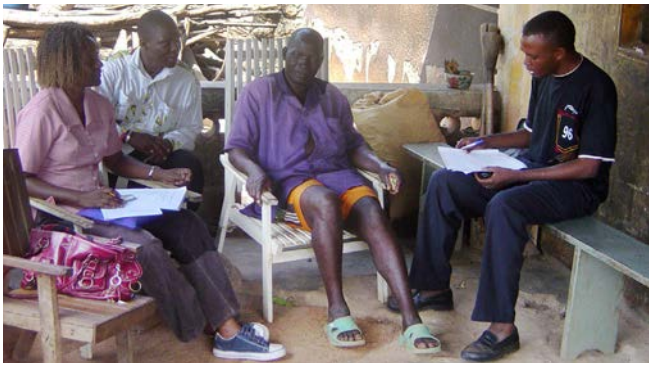
...ISTA8 continued on page 7

...Jeanne continued from page 4

encourage the growth and vitality of the industry. In Ghana and Kenya, where Jeanne's research is based, the majority of aquaculture production is small-scale, reliant on the on-farm sale of fish. These farmers thus face many challenges, such as high transactions costs, low returns, and lack of market incentives. To foster the growth of these farms and increase the revenue for the farmers, Jeanne states that "Ghana and Kenya should include linking small-scale commercial farmers into the market chain of the established commercial aquaculture, capture fisheries and seafood markets through organized and collective marketing efforts." In her thesis work, Jeanne has focused on four objectives: 1) developing an aquaculture supply chain framework for farm-raised fish, 2) training small- and medium-scale fish farmers in the management of this supply chain, 3) building synergies between fish producers and fish vendors in order to improve product and service delivery, and 4) equipping farmers with the skills for group marketing, developing new markets, developing distribution and market networks, and identifying value-added opportunities.

In addressing these goals, Jeanne has developed a questionnaire that will be used to survey all the stakeholders that she is targeting to help guide her to their specific needs. She then plans to organize workshops on supply chain management, pricing strategies, and quality and cost effectiveness in post harvest value chains. Utilization of study groups for case-study opportunities will provide practical experience in value chain management. The development of brochures and manuals with information gained in the research will allow Jeanne's findings to continue aiding in the development of market strategies even beyond the time frame of her work.

With an expected completion date in January 2010, Jeanne plans on visiting Ghana and Kenya in the spring or summer of 2009. She expects her "research to result in a design of some efficient marketing strategies that will help famers to be more integrated into the marketing chain in order to enhance their welfare." Jeanne has a great interest in international development and plans to work in this sector so that she may help in addressing problems of poverty, market participation, and the sustainable management of natural resources.



Jeanne Coulibaly (far left) conducting an interview at a rural household in Northern Côte d'Ivoire in 2006 as part of her previos research with dairy marketing.

...ISTA8 continued from previous page

Land Reclamation was the ISTA host for the symposium. The American Soybean Association, World Fish Center, AquaFish CRSP, World Aquaculture Society, American Tilapia Association, US Agency for International Development, Intervet-Schering-Plough, ZooControl, and the Global Aquaculture Alliance provided additional support. An additional grant from the US Department of Agriculture-Foreign Agricultural Service supported participation from several scientists from SubSaharan countries.

ISTA 9

The next ISTA has already been scheduled and will take place in Shanghai, China on October 15-18, 2010. Shanghai Ocean University (SOU) will host ISTA 9 at the same time as the Ninth Asian Fisheries Society meetings. SOU has an entirely new campus south of the Shanghai-Pudong International Airport in the master planned suburb of Lingang-Shanghai. The Howard Johnson's Hotel-Lingang will serve as one of the conference hotels along with the JinJiang Inn. Additional economical housing will be available in the graduate student dormitories on the SOU campus. ISTA 9 will also occur during the Shanghai 2010 World Expo. Many of our past sponsors have already agreed to co-sponsor the ISTA 9, along with additional support from the Chinese aquaculture industry.

...Mali continued from page 2

Theme One is being headed by AquaFish Host Country PI, Dr. Charles Ngugi from Moi University, focusing on the advancement of freshwater aquaculture practices and technologies. In order to identify appropriate strategies for pond aquaculture and make them available for use. Theme One provides hands-on training in pond construction, fish propagation, and pond management.

Headed by AquaFish Host Country PI, Dr. Yang Yi from Shanghai Ocean University, Theme Two promotes the sustainable development of rice-fish aquaculture and fisheries. Field trials and training courses help evaluate appropriate adaptations for rice-fish systems' introduction into the irrigation systems in the Niger River Delta. Like Theme One, Theme Two is using training courses and field trials to make appropriate strategies available to the people on the ground.

Theme Three aims at building community and consensus towards a fisheries management plan in target areas of Mali in order to ensure the long-term viability and sustainability of capture fisheries. Nancy Gitonga from FishAfrica in Kenya is heading this portion of the project, and is getting the local fishing groups involved in the groundwork and the survey processes for the management of their fisheries. Initial frame surveys are being done in the Lake Sélingué area.

Across the three themes, an emphasis is being placed on capacity building opportunities, sustainable solutions, and maximizing the benefits to the people of Mali without overexploiting their resources. Dissemination strategies have been determined for key stakeholder groups in order to ensure the highest level of communication and relevance, and to foster relationships for long-term cooperation. Already, a successful first training session was held in the fall of 2008, and another series of trainings and workshops are taking place in the first months of 2009. Collaboration across borders, seas, and language barriers makes this project valuable to the global community, using knowledge from where the expertise already exists to develop the systems where these skills are still needed.

...Photo continued from page 1

As the aquaculture industry grows, the demand for low-value fish for aquaculture feed is increasing and is placing a greater strain on the already degraded wild-catch fisheries. Ultimately, aquaculture will be constrained by its dependence on the wild-catch fisheries. The AquaFish investigations in Cambodia and Vietnam are thus looking to build a sustainable nexus between the two industries.

Juvenile fish being fed to snakehead fish in ponds. (So Nam)

The winning photo (from page 1) shows an excellent depiction of the wild-catch element of the fishing and aquaculture industry. A list of the 19 species of fish in the original picture is provided below. The photo on page 1 is cropped.

***Species* (Common name if available)**

Amblyrhynchichthys truncates
Cirrhinus jullieni
Cirrhinus lobatus
Cirrhinus siamensis (Siamese mud carp)
Crossocheilus reticulates
Gyrinocheilus aymonieri (Chinese/Siamese algaeeater)
Labeo chrysophekadion (Black sharkminnow),
Labiobarbus lineatus
Labiobarbus siamensis
Lobocheilos melanotaenia
Osteochilus microcephalus
Paralaubuca typus (Pelagic river carp)
Parambassis wolffii (Duskyfin glassy)
Pseudolais micronemus (Shortbarbel pangasius)
Syncrossus helodes (Tiger botia)
Thynnichthys thynnoides
Yasuhikotakia lecontei (Silver loach)
Yasuhikotakia modesta (Redtail botia)
Yasuhikotakia sp.

Notices of Publication

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

Strategies for Nile Tilapia (Oreochromis niloticus) Pond Culture
(08-241)

Yang Yi
College of Fisheries and Life
Shanghai Ocean University
Shanghai, China
yiyang@shou.edu.cn

James Diana
School of Natural Resources and Environment
University of Michigan
Ann Arbor, Michigan 48109-1115, USA

Different strategies for Nile tilapia (*Oreochromis niloticus*) culture in ponds with a series of progressive inputs were compared. The sequential experimental stages to increase fish production through intensification were: 1) triple superphosphate (TSP) only; 2) chicken manure only; 3) chicken manure supplemented with urea or urea and TSP; 4) urea and TSP; 5) continually supplemental feeding; 6) staged supplemental feeding; 7) feeding alone.

The results showed that the choices of input regimes with increasing economic gains are: 1) fertilizing ponds with moderate loading of chicken manure; 2) fertilizing ponds with chicken manure supplemented with urea and TSP; 3) fertilizing ponds with urea and TSP; 4) fertilizing ponds initially with urea and TSP in combination of supplemental pelleted feed at 50% satiation level at later stage of grow-out cycle.

This Abstract was excerpted from the original paper, which was published in the *Proceedings of the 8th International Symposium on Tilapia in Aquaculture*, Cairo, Egypt, 12-14 October 2008

Errata:
NOP's 08-A1 through 08-A6 were numbered incorrectly in the previous issue of AquaNews and should be numbered 08-235 through 08-240 respectively. The full NOP and abstract of these research reports with corrected the numberings will be posted on the publications page of the AquaFish website. We extend our apologies for any confusion.

Determination of quercetin concentrations in fish tissues after feeding quercetin-containing diets
(08-242)

Kwan Ha Park, Gustavo A. Rodriguez-Montes de Oca, Pierluigi Bonello, Kyeong-Jun Lee, Konrad Dabrowski

Concentrations of quercetin in fish tissues were measured for the first time using HPLC-electrochemical detection method. Its identity was also ascertained with UVphotodiode array detection. Quercetin, in aglycone form, was at measurable concentrations in tilapia plasma, liver, and whole body homogenate when fed with diets containing 1% quercetin (aglycone) for 1 or 15 weeks. Hydrolysis with glucuronidase/sulfatase treatment for the purpose of cleaving conjugates did not increase quercetin levels, suggesting that glucoronide or sulfate conjugates are not the major metabolic forms in Nile tilapia (Oreochromis niloticus). No quercetin was detected in plasma of rainbow trout (Salmo gairdneri) or white sturgeon (Acipenser transmontanus) fed commercial diets. The results suggest that quercetin is absorbed in tilapia and that this flavonoid is deposited mainly in aglycone form in the body after absorption.

This Abstract was excerpted from the original paper, which was published in *Aquaculture International* Online, 30 September 2008.

Optimizing Tilapia, Oreochromis sp., Marketing Strategies inNicaragua: A Mixed-integer Transshipment Model Analysis
(08-243)

Carlos M. Leyva and Carole R. Engle
Aquaculture/Fisheries Center
University of Arkansas at Pine Bluff, Mail Slot 4912, Pine Bluff,
Arkansas 71601 USA

Tilapia, Oreochromis sp., production has increased in the Central American region in recent years. Yet, commercial tilapia aquaculture has not developed in Nicaragua on the scale that it has in other neighboring countries. Although demand for tilapia products exists, lack of thorough understanding of domestic markets and coordinated production and marketing efforts

...NOP's Continued on Page10

Notices of Publication, Continued...

have hampered the development of a domestic market. The objectives of this study were to quantify domestic marketing costs for tilapia produced in Nicaragua and develop a mixed-integer transshipment mathematical programming model to identify the most profitable marketing alternatives for tilapia farmers. Results suggested targeting primarily outlets with higher sales prices such as restaurants with supplemental production delivered to local supermarkets. The model chooses cities with weekly restaurant demand capable of absorbing the farm's production with excess product sold to alternative outlets. Supply of farm-raised tilapia production in most regions of Nicaragua was insufficient and created problems associated with frequent and dependable deliveries required by higher paying outlets (restaurants and supermarkets). Larger farms will generate greater returns with regular consistent deliveries to higher priced restaurant outlets. Smaller farms with limited production volumes were not able to meet weekly delivery requirements. Biannual deliveries reduced transportation cost and sales price and were not profitable. However, sustaining markets with infrequent deliveries may not be feasible. This analysis provides guidelines for targeting those specific markets that optimize returns to specific farm sizes in specific regions.

This Abstract was excerpted from the original paper, which was published in the *Journal of the World Aquaculture Society*, Vol. 39, No. 3 in June, 2008.

Effects of Different Dietary Lipid Sources on the Survival, Growth, and Fatty Acid Composition of South American Catfish, Pseudoplatystoma fasciatum, Surubim, Juveniles (08-244)

Murat Arslan
Department of Fisheries and Aquaculture
Ispir H. Polat Vocational School
Ataturk University, Ispir, Erzurum 25900 Turkey
School of Environment and Natural Resources
Ohio State University, Columbus, Ohio 43210 USA

Jacques Rinchard and Konrad Dabrowski
School of Environment and Natural Resources
Ohio State University, Columbus, Ohio 43210 USA

Maria Celia Portella
Aquaculture Center
Department of Applied Biology in Agriculture
Sao Paulo State University, Jaboticabal, Sao Paulo, Brazil 14884-900

The present study examines the effect of four semi-purified diets (casein–gelatin based) where the source of fatty acids was free (esterified) oleic acid and linoleic acid (LA) (LOA diet), linseed and olive oil (predominantly LA and linolenic acid) (LO diet), cod liver oil (rich in highly unsaturated fatty acids) (CLO diet), and soybean lecithin (phospholipids; mostly LA) (LE diet) on the growth of juvenile South American catfish (surubim, Pseudoplatystoma fasciatum, Pimelodidae) (0.98 ± 0.04 g individual weight). Fish were fed at a restricted–readjusted feeding rate for 8 wk. At the end of the experiment, LE-diet-fed fish grew significantly larger than those of the other three groups ($P < 0.05$). Considerable cannibalism was observed in all the treatments. It is suggested that the quantitative growth performance may possibly change under other conditions, with less or no cannibalism. Survival did not differ significantly among the fish fed four different diets. Muscle and liver lipid contents did not vary among dietary treatments ($P > 0.05$), but whole-body lipid concentrations were affected by dietary treatments. Fish fed LE diet contained significantly lower lipid level than those fed three other diets ($P < 0.05$). Muscle and liver fatty acid profiles reflected dietary fatty acid composition. Arachidonic acid level was significantly higher in muscle and liver of fish fed LOA and LE diets than in those fed LO and CLO diets. The results suggest that the efficiency of elongation and desaturation of 18C fatty acids depends on the dietary lipid source, and South American catfish has considerable capacity to transform linoleate to arachidonate.

This Abstract was excerpted from the original paper, which was published in the *Journal of the World Aquaculture Society*, Vol. 39, No. 1 in February, 2008.

Upcoming Meetings and Events...

The AquaFish CRSP is proud to support work shops and meetings designed to facilitate increased knowledge and communication in aquaculture. Meetings and workshops coming up in 2009 include...

World Aquacuture Society: Aquaculture America 2009
15-18 February 2009 in Seattle, Washington
https://www.was.org/WasMeetings/meetings/Default.aspx?code=AA2009

International Aquaculture Development for the Poor
Monday 16 February 1-3 pm
Chaired by CRSP Director, Hillary Egna

AquaFish CRSP Annual Meeting
15 February 2009 in Seattle, Washington

http://aquafishcrsp.oregonstate.edu/seattle.php

World Aquaculture 2009
25-29 May 2009 in Veracruz, Mexico
https://www.was.org/WasMeetings/meetings/pdf/WA2009RegBrochure.pdf

For more meetings and employment opportunities please visit our Education and Employment Opportunities network database online, EdOpNet, at http://pdacrsp.oregonstate.edu/edops/edop.html

Poetry Corner

The Tide Rises, the Tide Falls

by Henry Wadsworth Longfellow (1807–1882)

The tide rises, the tide falls,
The twilight darkens, the curlew calls;
Along the sea-sands damp and brown
The traveller hastens toward the town,
And the tide rises, the tide falls.

Darkness settles on roofs and walls,
But the sea, the sea in the darkness calls;
The little waves, with their soft, white hands,
Efface the footprints in the sands,
And the tide rises, the tide falls.

The morning breaks; the steeds in their stalls
Stamp and neigh, as the hostler calls;
The day returns, but nevermore
Returns the traveller to the shore,
And the tide rises, the tide falls.

...Podcasts continued from page 1

is a broad new tool being used to share the most current information on tilapia aquaculture. It can be accessed wherever the Internet is available so these podcasts have applications in the global community as well.

The current podcast is a thorough book review by Chris Brown, CRSP US researcher involved in tilapia aquaculture in the Philippines. While displaying a slideshow of images of tilapia cultivation and research from around the Philippines, Brown provides an analysis and comparison of the two prominent textbooks in review: Tilapia Biology, Culture and Nutrition and Tilapia Culture. Podcasts to follow will provide information on alternative feeding methods that tilapia farmers can use. In January 2009, a workshop at Central Luzon State University was held to launch the podcast series.

AquaFish CRSP
Oregon State University
418 Snell Hall
Corvallis OR 97331-1643 USA
http://aquafishcrsp.oregonstate.edu/

AquaFish CRSP Contact Information

AquaFish CRSP and Aquaculture CRSP publications can be accessed online at http://pdacrsp.oregonstate.edu/pubs/publications.html.

Notice: *Aquanews* is available only electronically beginning with our Spring 2007 (Vol. 22 no. 2) issue. If you wish to add your name to the list of email recipients, please subscribe at http://lists.oregonstate.edu/mailman/listinfo/pdacrsp. As always, *Aquanews* editions are archived on-line at http://aquafishcrsp.oregonstate.edu/publications.php

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

Program Director: Dr. Hillary S. Egna
Aquanews Editor: Stephanie Ichien

Aquanews is published quarterly by the Publications division of the Aquaculture CRSP and AquaFish CRSP, Oregon State University, 418 Snell Hall, Corvallis OR 97331-1643, USA.
aquafish@oregonstate.edu

The AquaFish Collaborative Research Support Program is funded in part by the United States Agency for International Development under CRSP Agreement No. EPP-A-00-06-00012-00 and by participating US and host country institutions.