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AQUAFISH CRSP MALI PROJECT REFLECTIONS: THREE YEARS, THREE THEMES, MANY ACHIEVEMENTS

By *Jim Bowman*



A Malian fish farmer uses a cast net to sample fish in his pond during a field trip by participants in one of the project's short courses in 2009. Photo by Charles Ngugi.

After just over three years of focused aquaculture and fisheries progress, the CRSP's Mali Project wrapped up its work on 31 December 2010. This project, "Aquatic Resource Use and Conservation for Sustainable Freshwater Aquaculture and Fisheries in Mali", was funded by USAID's Mali Mission under an Associate Award, with the objective of providing access to improved technologies for Malian farmers, fishers, government and non-government technical staff, and other stakeholders along the fishery products value chain. Through appropriate technological applications with a focus on management, the project aimed to advance sustainable freshwater aquaculture practices, promote rice-fish culture techniques, and facilitate the development of community-based management plans for Mali's fisheries.

To achieve these goals, the project took a South-South approach, collaborating with partners in other AquaFish CRSP host-countries to transfer their most successful practices to Mali and adapt them to local conditions. The project was divided into three themes and headed by AquaFish collaborators and Host Country PIs, emphasizing capacity building opportunities and sustainable solutions for maximizing benefits to the people of Mali. Nancy Gitonga of FishAfrica,

Mali continued on Page 2...

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headquartered in Nairobi, Kenya, provided leadership for the fisheries management planning effort; Yang Yi and Liu Liping of Shanghai Ocean University in Shanghai, China, took the lead for the rice-fish culture component; and Charles Ngugi of Moi University and Kenyatta University, in Kenya, guided the work of the pond culture activities.



Participants observing zooplankton (natural catfish food) collect from a pond at the Sotuba Training Center in Bamako, Mali. Photo by Liu Liping.

With the objective of providing improved technologies to our selected target audiences, a total of 20 workshops, which attracted a total of 358 participants, were conducted across the projects three themes over three years. These workshops covered a wide-range of aquaculture and fisheries topics, including pond site selection, pond construction, pond management, up-to-date techniques for rice-fish culture, fish transportation, catfish propagation and care of fry, best management practices, post-harvest technologies, and lake survey techniques. They also included three stakeholders' workshops to discuss the results of the Lake Sélingué frame survey that has prompted planning for co-management of that lake.

Field tests and demonstrations complemented the workshop activities with guided hands-on experience to farmers. The pond culture team conducted two sets of on-farm trials and the rice-fish team coordinated and supervised a

Mali continued on Page 3...

Goings-on in the Pond...



Dr. Jason Licamele, former AquaFish CRSP graduate student, was one of 18 Presidential Volunteer Service Award recipients honored by the U.S. Agency for International Development (USAID) under the John Ogonowski and Doug Bereuter Farmer-to-Farmer program. Dr. Licamele was recognized for collaborative work between the University of Arizona and Aquaculture without Frontiers (AwF). His work involved Farmer-to-Farmer volunteer trips to provide on-site training in small-scale sustainable aquaculture techniques in Trinidad, Guyana, and New Caledonia. For more information, see the full press release at: www.usaid.gov/press/releases/2010/pr101210.html

Boamah Yaw Ansah, a recent AquaFish CRSP graduate student and PhD candidate at the Virginia Polytechnic Institute & State University, has been selected as a Fellow for the Borlaug Leadership Enhancement in Agriculture Program (LEAP). He is recognized by the Norman E. Borlaug International Agriculture Science and Technology Fellows Program for his outstanding leadership potential as demonstrated by his work on freshwater pond aquaculture in collaboration with Purdue University and the University of Arkansas at Pine Bluff.

To read more about the Borlaug fellowship program, visit:

www.fas.usda.gov/icd/borlaug/About_the_Fellowship/PrgmDspt.asp



Photo courtesy of Boamah Yaw Ansah.

The AquaFish CRSP Fourth Annual Report is now available on our website. To view this publication, please visit: aquafishcrsp.oregonstate.edu/publications.php

...Mali continued from Page 2

set of rice-fish demonstration plots. Through the application of improved management practices and supervision by project leaders, farmers participating in the on-farm trials realized yields of up to 9000 kg/ha in a six-month period (18,000 kg/ha/yr), a substantial increase over the estimated average productivity of ponds at the beginning of the project (1500 kg/ha/yr). In the rice-fish demonstrations, after approximately four months of culture, one farmer harvested 115 kg of fish from a rice paddy just 840 m² in area (equivalent to 1369 kg/ha), substantially contributing to the family income.

The fisheries planning component accomplished the first ever frame survey of Lake Sélingué, preceded by two workshops to train those who would be conducting the survey. This not only produced a valuable baseline dataset for evaluating the fishing capacity of the lake, but also resulted in the creation of a cadre of individuals trained in survey techniques so that they now have the capacity to conduct future surveys.

Highlights of the project's successes include:

- Technicians of Mali's National Fisheries Directorate have been trained in pond culture, rice-fish culture, and lake survey techniques and can now apply them to future development activities in the country. Following their training, several trainees have taken lead roles in transferring their new-found knowledge to other Malians.
- One of the initial pond culture trainees has been instrumental in setting up catfish hatching systems in at least three locations and is now producing and selling catfish fingerlings on his own. In addition, he has himself become a trainer, leading at least four pond-construction training sessions for 90 people in Bougouni, Segou, Sanankoroba, and Gao during the final year of the project. Over 120 people have visited his farm seeking fish farming advice and 16 of these have started to build ponds of their own.
- After observing the results of the project's rice-fish demonstrations, at least 22 new farmers in the Baguineda area decided to modify their fields to include fish during the 2010 growing season. With assistance from government technicians, rice farmers in other parts of Mali are also taking up rice-fish culture.



Malian technicians constructed a hatching system at the Sotuba Training Center in Bamako, Mali, which has since been used to train other Malians in the rearing of catfish fry. Photo by Jim Bowman.

The work of the AquaFish CRSP Mali Project has thus set the stage for further development of the aquaculture and fisheries sectors in Mali. Fish farmers have received previously unavailable technical information that will enable them to expand aquaculture production as well as increase their productivity per unit area. Fishers in Lake Sélingué have been brought into the management planning process, and the technical staff of the Direction Nationale de la Pêche now has the skills needed for conducting additional frame surveys in the future, whether at Lake Sélingué or elsewhere. Rice farmers in Baguineda and other areas have seen how irrigated rice fields can be modified to accommodate a crop of fish, and many of them are now doing this. Both rice farmers and fish farmers have learned how to produce more fish in their respective areas, thus bringing in added food and income to support their families.

For additional information on key collaborators and their affiliations please visit the following websites:

Charles Ngugi of Moi University and Kenyatta University (<http://www.mu.ac.ke/>) (<http://www.ku.ac.ke/>)
 Nancy Gitonga of FishAfrica (<http://fishafrica.co.ke/index.htm>)
 Liu Liping and Yang Yi (1963-2009) of Shanghai Ocean University (<http://eng.shou.edu.cn/>).



GRADUATE STUDENT PROFILE: ALEJANDRO MACDONAL-VERA

By Chelsea Stephen

Alejandro Macdonal-Vera has strong ties with Universidad Juarez Autonoma de Tabasco (UJAT). Not only is he a former AquaFish supported graduate student at the university, where he completed his Masters degree in Environmental Science, but UJAT is also where he hopes to one day establish himself as a fulltime professor. Judging by Alejandro's dedication to projects that stand to improve the economy of rural aquaculture producers in the region, this seems like a natural fit.

The university upholds the mission to "prepare professionals with broad expertise in their area of study to fulfill the needs of Tabasco and the country at large." It was here that Alejandro – Alex to friends and colleagues – discovered a rich diversity of aquaculture studies and the regional application of related research activities. He completed his Masters degree, evaluating the polyculture of red tilapia and shrimp in the Southeast State of Sinaloa, and continues to be plugged in to both the socioeconomic and conservation aspects of aquaculture development in his native home of Mexico.



Alejandro Macdonal-Vera, at work at the aquaculture facility at Universidad Juarez Autonoma de Tabasco (UJAT) in Tabasco, Mexico. Photo courtesy of Alejandro Macdonal-Vera.

TRANSFORMING LOCAL PRACTICES FOR FEEDING SNAKEHEAD FISH IN AQUACULTURE IN VIETNAM

By David A. Bengtson, Tran Thi Thanh Hien, Le Xuan Sinh, Chong M. Lee, and Robert S. Pomeroy



A feeding frenzy of snakehead, as they break the surface of the pond to snag AquaFish CRSP pellets fed at a farm in Vietnam. Photo courtesy of Robert Pomeroy.

Snakehead culture is a growing industry in Vietnam, with two species in production: the giant snakehead (*Channa micropeltes*), produced primarily in cages, and the snakehead murrel (*Channa striata*), produced primarily in ponds. As is still the case with some small-scale catfish production in Vietnam, the preferred aquaculture feed for snakehead has been small fish (also known as low-value fish or trash fish) taken mostly from the Mekong River. In Cambodia, such reliance on small fish as feed has resulted in a ban on snakehead culture. One of the goals of the Aquafish CRSP project "Development of Alternatives to the Use of Freshwater Low Value Fish for Aquaculture in the Lower Mekong Basin of Cambodia and Vietnam: Implications for Livelihoods, Production, and Markets" has been to reduce or eliminate the use of small fish as feed for the snakehead industry. One part of this project, the investigation entitled "Alternative feeds for freshwater aquaculture species in Vietnam" specifically studies ways to raise snakehead on formulated pellet feed.

Graduate Student Profile continued on Page 8...

Snakehead continued on Page 5...

...Snakehead continued from Page 4

In the first part of this project, there were several significant findings. First, researchers at Can Tho University found that the small fish used as feed for snakehead culture in Vietnam represented 33 species, many of which were commercially important species in their juvenile stages. Second, they determined the optimum weaning protocol to train snakehead in the hatchery to eat pellets, rather than live feeds, at a young age. This was critical because if snakehead are raised too long on live feeds, they will not want to switch to pellets and will have to be fed small fish. Finally, in the major part of the project, we conducted several experiments to test various pellet diets on snakehead. These included diets in which a significant portion of the fish meal was replaced by soybean meal with added amino acids, taurine and phytase, as well as local products like cassava meal and rice bran as a protein source. Phase One of this project ended with a small-scale field trial in which snakehead were raised on three diets: small fish only, a fish-meal based pellet diet, and fish-meal plus plant protein pellet diet. After six months of rearing, the fish were prepared as filets for a blind taste test by Can Tho University (CTU) students. The very positive result from this taste test was that students could not distinguish any significant differences among the filets from fish fed the three diets.

Armed with the results of both lab studies on survival and growth of the fish reared on pellets and the taste test, Dr. Hien was able to recruit a local feed mill to produce the AquaFish CRSP

diets and more than 50 farmers in Dongthap and An Giang provinces to use those diets in rearing snakehead. She and her students collaborated with local fisheries departments in the provinces to set up technology transfer sessions for fisheries technicians and farmers, both at CTU and in the local areas. In these sessions they shared results of their on-farm trials and discussed the production of pellet feed by the cooperating feed mill. In addition, Dr. Le Xuan Sinh explained the harmful effects of using small fish as feed in snakehead culture, both economically and ecologically. Every month, CTU and feed mill staff visit the farmers to collect data on water quality, fish growth, fish health, etc., to monitor the results of this phase of the work, as well as to provide guidance to the farmers on snakehead culture.

One of the problems with snakehead culture in Cambodia is that there are no snakehead hatcheries, as there are in Vietnam. Any snakehead used in aquaculture in Cambodia would be collected from natural waters like the Mekong River or Tonle Sap as juveniles past the age at which they can be transitioned to formulated feed. Thus, two needs must be met for snakehead culture to be instituted in Cambodia: a) provision of hatchery-reared juveniles trained to eat formulated diets, and

b) the pellet diets to feed them so that farmers do not use small fish. In Phase Two of the project, Cambodian fishery biologists spent time in Vietnam learning hatchery production techniques and have begun small-scale hatchery production of snakehead in a government hatchery in Cambodia.



Can Tho University staff member holding one of the bags used to ship the AquaFish diets to farmers. Photo courtesy of Robert Pomeroy.

LEARNING & SHARING THROUGH MULTIMEDIA: VICTOR MOTARI

By Chelsea Stephen



Victor Motari filming Nile perch caught with bait fish on Lake Victoria, Kenya. Photo courtesy of Victor Motari.

Growing up in Nairobi, Kenya, Victor Motari has an acute sense of the role that the fish industry has in Kenya. Despite being aware of the present challenges that fish farmers face, his perspective on the issues of aquaculture is infused with an overwhelming sense of optimism. In fact, given his breadth of knowledge and experience in the field, it's surprising to learn that Motari is only just completing his undergraduate degree at Kenyatta University.

Victor first got involved in AquaFish in 2009 when, at the university, he met AquaFish Host Country Principal Investigator Dr. Charles Ngugi who saw great potential in the young student. Since then, Victor has gotten broad exposure to the many aquaculture activities going on in and around his home of Nairobi. Under Dr. Ngugi's guidance, Victor has participated in value chain development for catfish and tilapia production, as well as the assessment of integrated pond-cage systems for the production of Nile tilapia for improved livelihood of small-scale fish farmers in Kenya. His involvement has been instrumental in documenting

aquaculture activities throughout Kenya, ranging from on-farm trials and workshops to the bustle of field and market activity. In the process, Victor has observed the many challenges faced by small-scale farmers including the adoption of best management practices and availability of quality seed and fish feed. But it's the success stories – such as that of catfish bait producers and tilapia farmers in central and western provinces – that sustain his optimism. "I have learned that the various challenges present in aquaculture are not insurmountable but can be overcome by embracing new and better alternatives, knowledge, innovations, skills and technologies," he remarks.

Indeed, there seems to be no limit to what Victor has learned in the process. "I have been able to participate in regional projects from which I've learned a lot more about the technologies applied in aquaculture systems in different regions," says Victor. This exposure has allowed him to interact with fish farmers on the ground, an experience that has proven educational, enjoyable, and motivational. "I have found so much joy in community development," he adds. "I am always excited to hear stories of how the local fish farmers are prospering and earning better income."

Victor first got involved in these projects because he wanted to see more young people and women take up aquaculture with the seriousness he believes it deserves, and because, as he says, learning and sharing is exciting and more fulfilling when it results in empowering other to improve their livelihoods. "I was impressed by the enthusiasm of the women who attended a training in Mumias, Kenya, in November 2010," he states. "It goes to show that the support for tools of development is never in vain but a worthwhile investment since women, too, are more than willing to adopt them."

So where does he want to go from here? You can bet his future will involve continuing his work with aquaculture and perhaps even one day starting his own fish farm. When asked if he'll be continuing his studies, Victor's responds: "Certainly, yes!"

"I have learned that the various challenges present in aquaculture are not insurmountable but can be overcome by embracing new and better alternatives, knowledge, innovations, skills and technologies"

Victor Motari continued on Page 8...

LESSONS IN THE FIELD: FOURTH ANNUAL FISH FARMERS SYMPOSIUM IN KAMPALA, UGANDA

By Chelsea Stephen

The Uganda Manufacturers Association (UMA) Grounds Conference Hall was buzzing with activity on 12 January 2011. Farmers, local manufacturers, fish processors, traders, policy makers, service providers and suppliers, researchers, and trainers came together at the start of the Fourth Annual Fish Farmers Symposium.

The Annual Fish Farmers Symposium, organized in part by AquaFish CRSP, collaboratively addresses issues in commercial fish farming among all stakeholders along the farmed fish value chain. Focus sessions, trade fairs, and field trips were organized throughout the three-day symposium in Kampala, Uganda, centering on the theme of "Viable Fish Farming". The objective of the symposium was to promote collaboration among stakeholders in the aquaculture sector to exchange information that would help others overcome challenges and enhance sustainable development. In addressing key issues that have impacted fish farmer enterprises from previous years, focus was directed towards production planning and management, fish feeds, value addition and marketing, and available support services in the aquaculture private sector.

The symposium was supported by several keynote speakers who shared their experiences, and optional tours and trade fairs bolstered learning and networking by providing tangible products, brochures, and demonstrations. Commercial seines and cages, value-added fish products, feed samples, and a new fish hauling truck were among the many highlights of the trade fair.

Karen Veverica, an AquaFish collaborator of Auburn University, participated in the many events she help coordinate. During a tour, Veverica and others visited Uganda's feed manufacturing plant, UgaChick. On-site demonstrations at the plant consisted of catfish filleting and product pricing, feed manufacturing and storage, and in-pond feeding of floating pellets.

Veverica noted that the number of participants at the symposium reflected similar numbers to last year's attendance, with many first-time participants this year. "The main difference this time," added Veverica, "was that all participants seemed more profit oriented."

A less obvious measure of the symposium's success was the motivation that the events inspired. Two Kenyan participants expressed a desire to have meetings like this one in their own country. As a start, they have initiated farm tours for Kenyan participants to encourage collaboration close to home. "In all," Veverica remarked, "it was an excellent training activity and a very good networking venue."



Sampling demonstration at the Fish Farmers Symposium (Left) and a tilapia species handled by a participant (Right) (Photo courtesy of Walimi Fish Farmers Cooperative Society, 2010)

There is no doubting Alex's expertise in the field of aquaculture. To date, he has amassed a total of 13 years in the industry, and has contributed his skills in a range of investigations. Under the guidance of his major professor, AquaFish CRSP Host Country Principal Investigator Dr. Wildfrido Contreras Sanchez, Alex is currently working on two investigations in collaboration with AquaFish CRSP, the first of which is an investigation of selective breeding programs for native cichlid and snook aquaculture. This project is a continuation of the earlier breeding program initiated in 2007 using wild castarrica (*Rocio octofasciata*) and tenhuayaca (*Petenia splendida*) broodstock, from which the first generation of selected native fish was obtained. Alex has been involved in the successful sex-reversal and breeding of these native cichlids, as well as in the progress leading to induced spawning and reproduction of snook species. Continuing the selective breeding programs of these species will provide cultivators – primarily poor farmers – with native fish seed stock that exhibit better growth characteristics, promoting conservation of an economically important natural resource.

Alex is also involved in an investigation on sustainable integrated aquaponics and the evaluation of fingerling quality in Tabasco, Mexico. Continuing research will focus on improvements in the production of juvenile tilapia for growers. A comparative experiment on growth performance and cost of production of several strains of tilapia will provide farmers with unbiased information from which they can make decisions on purchasing economically viable fingerlings. Alex and the AquaFish team at UJAT are also developing a method to eliminate methyl-testosterone used in masculinization systems for tilapia sex-reversal (see *Aquanews Fall 2010*).

"I have enjoyed sharing my knowledge and experience with producers about management technique of diverse culture species," Alejandro says about his work with the CRSP. He is pleased to see new methodologies developed from his research subsequently implemented by producers in the region. It is his hope that his research will provide quality fingerlings to producers, and help repopulate native water bodies with economically important snook and native cichlids.



We are proud of Victor's accomplishments and look forward to seeing him progress towards his goals. To view Victor Motari's videos hosted by Youtube and Vimeo, please follow the links below:

You Tube www.youtube.com/watch?v=FWS3U3jp5Nw

The preparation of hormonal extract using the male catfish's pituitary gland, removed using two methods as demonstrated in Mwea Aquafish Farm in Kenya as part of a collaboration with SARNISSA (Sustainable Aquaculture Research Networks in Sub Saharan Africa).

The process can also be viewed with Vimeo:  <http://vimeo.com/13338859>

You Tube www.youtube.com/watch?v=MZal_v54yDY

The AquaFish CRSP Success Story on the formation and initiation of the Bidii Fish Farming Cluster, including footage from a CRSP training.

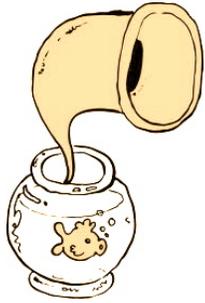
You Tube www.youtube.com/watch?v=E5mpA3MPp2w

The Minister of fisheries (Kenya) visits Mwea Aquafish Farm in Kenya in order to assess the success of the Economic Stimulus Program initiated by the government so as to jump start the Kenyan economy in rural areas participating in fish farming.



Victor Motari with Professor Charles Ngugi and Judith Amadiva during a visit to William Kiama's ornamental fish farm in Kenya. (from left to right: Kiama, Ngugi, Amadiva, and Motari). Photo courtesy of Victor Motari.





Notices of Publication

Notices of Publication announce recently published work carried out under AquaFish CRSP sponsorship. To receive a full copy of a report, please contact the author(s) directly. All past and present Notices of Publication can be found on the AquaFish CRSP website at:
aquafishcrsp.oregonstate.edu/publications.php

TILAPIA UPDATE 2010 (10-264)

Kevin Fitzsimmons

University of Arizona
 Tuscan, Arizona, USA

International production continues to grow rapidly (10-15% yearly) as markets in developed countries import more and consumption in the producing countries also increases. China continues to be the largest producer, consumer, and exporter with about 1.2 million metric tons of production in 2009. Indonesia, Thailand, Vietnam, and Philippines have all increased production by 10 to 20% per year in 2008 and 2009. Indonesia's production in 2008 reached 328,831 metric tons, becoming the world's number two producer, followed closely by Thailand and Egypt.

This abstract was excerpted from the original paper, which was published in *The Practical: Asian Aquaculture* 1(2):32-34, 2010.

CLAY FLOCCULATION COUNTERS MICROCYSTIN POLLUTION IN CHINA STUDY (10-265)

Song Biyu¹, Yang Yi², James Diana³

¹College of Resources and Environmental Science
 Wuhan University
 Wuhan, Hubei Province, China

²Formerly Shanghai Ocean University

³Michigan Sea Grant
 School of Natural Resources and Environment
 University of Michigan

Since typical water treatment processes are ineffective at removing toxic microcystins, techniques for liminating microcystin-producing algae in water bodies have been developed. The most promising microcystin control in aquaculture is flocculation and sedimentation of harmful algal blooms with clay. In a study with tilapia in a eutrophic fish pond, the authors found that polymeric aluminum chloride-modified clay had a faster and slightly stronger effect in removing *M. aeruginosa* than a more environmentally friendly chitosan-modified clay.

This abstract was excerpted from the original paper, which was published in *Global Aquaculture Advocate* 13(E3): 26-27, November / December 2010.

CAGE DESIGN, PLACEMENT AFFECT WATER QUALITY (10-266)

Claude E. Boyd

Department of Fisheries and Allied Aquacultures
 Auburn University
 Auburn, Alabama 36849 USA

Farm cages should be sited where water quality is good and water velocity is adequate. The size, shape and position of cages should be selected to favor rapid flushing. Fish can typically be cultured at greater density in small cages than in larger ones. Cages should be oriented with the greatest surface area perpendicular to the prevailing current. Cages should occasionally be fallowed or moved to allow benthic communities to recover.

This abstract was excerpted from the original paper, which was published in *Global Aquaculture Advocate* 13(E3): 21-22, November / December 2010.

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REPLACEMENT OF FISH MEAL PROTEIN BY SOYBEAN MEAL PROTEIN WITH OR WITHOUT PHYTASE SUPPLEMENTATION IN SNAKEHEAD (*CHANNA STRIATA*) DIETS (10-267)

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¹College of Aquaculture and Fisheries
Can Tho University, Can Tho, Viet Nam

The study was conducted with snakehead *Channa striata* fingerlings (4-5g per fish) to determine the appropriate replacing levels of fish meal (FM) protein by soybean meal (SBM) protein with or without phytase supplementation. Nine isonitrogenous (45%) and isocaloric (4.7 Kcal g⁻¹) diets were formulated to replace FM protein by SBM protein. The control diet was prepared with FM protein. The other groups, FM protein was replaced by SBM protein in the diets at replacing levels of 20%, 30%, 40%, and 50% with or without phytase. The experiment results showed there were no significant differences in survival rate among the treatments ($P>0.05$), ranging between 54.4% and 63.3%. Fish growth had a downward trend (from 0.28 to 0.14 g.day⁻¹), the opposite was true for feed conversion efficiency (from 1.07 to 1.78) when SBM protein was increased in formulated feed. In addition, phytase did not affect body composition and there were not significant differences in hepatic somatic index among the treatments ($P>0.05$). In terms of economic profits, compared to control diet, replacement of FM protein by SBM protein with phytase supplement at 40% in *Channa striata* diets decreased slightly by 0.89%. To sum up, FM protein in *Channa striata* fingerlings diets can be replaced by SBM protein at 30% and 40%, without or with phytase supplements, respectively in which growth performances, feed utilizations are not affected.

This abstract was excerpted from the original paper, which was published in *The Scientific Journal of Can Tho University*, 2010.

REPLACING FISH MEAL BY SOYBEAN MEAL IN GIANT SNAKEHEAD (*CHANNA MICROPELTES*) DIETS (10-268)

¹Tran Thi Thanh Hien, Lê Quoc Toán, ¹Tran Thi Bé, Nguyen Hoàng Duc Trung

¹College of Aquaculture and Fisheries
Can Tho University, Can Tho, Viet Nam

This study was designed to determine the maximum replacing levels of fish meal protein (FM) by soybean meal protein (SBM), defatted with phytase enzyme supplementation for *Channa micropeltes*. FM in the basal diet was replaced by SBM in the diets at replacing levels of 20, 30, 40, and 50% with 0.02% phytase supplementation. *Channa micropeltes* fingerlings (4.3±0.03 g/fish) were randomly distributed into 15 tanks (100 liters/tank) with 25 individuals per tanks. Fish were fed twice a day to satiate. After 8 weeks of feeding, there were no significant differences in survival rate (SR) among the treatments, ranging between 77.3% and 80%. Compare to control treatment (FM), replacement of 20, 30 and 40% of FM by SBM did not significantly affected on growth performance, feed conversion ratio (FCR) and protein efficiency ratio (PER) while the replacing level of 50% significantly reduced these parameters, except FCR. Results also showed that there weren't significant differences in crude protein content in whole body as the dietary soybean meal replacement levels increased. From economic view, replacement of FM by SBM up to 40% in *Channa micropeltes* diets reduced feed costs/kg diet and feed costs/kg weight gain by 10.8% and 4.83%, respectively. (available in Vietnamese on our website at <http://aquafishcrsp.oregonstate.edu/nops.php>)

This abstract was excerpted from the original paper, which was published in *The Scientific Journal of Can Tho University*, 2010.

All past and present Notices of Publication can be found on the AquaFish CRSP website at: aquafishcrsp.oregonstate.edu/publications.php

Upcoming Meetings and Events...

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

ISTA 9 (International Symposium on Tilapia in Aquaculture)

21– 24 April 2011
Shanghai Ocean University
Shanghai, China
ag.arizona.edu/azaqua/ista/ISTA9/ISTA9.htm

9AFAF (Asian Fisheries & Aquaculture Forum)

21– 25 April 2011
AquaFish CRSP Annual Meeting, convening:
18-20 April 2011
Shanghai Ocean University (SHOU)
Shanghai, China
www.9AFAF.org

World Aquaculture 2010

6 – 10 June 2011
Natal, Brazil
www.was.org/WasMeetings/meetings/Default.aspx?code=WA2011

Third International Conference on Sustainable Animal Agriculture for Developing Countries (SAADC 2011)

26 - 29 July 2011
Nakhon Ratchasima, Thailand
www.saadc2011.com/home.php

Fifth International Symposium on GIS/Spatial Analyses in Fishery and Aquatic Sciences

22– 26 August 2011
Wellington, New Zealand
www.esl.co.jp/Sympo/5th/first_announcement.pdf

For more meeting and employment opportunities visit our Education & Employment Opportunities Network database online, EdOpNet, at aquafishcrsp.oregonstate.edu/edop.php

PONDERINGS...

THE VIEW FROM LAZY POINT

By Carl Safina

The world still sings. Yet the warnings are wise. We have lost much, and we're risking much more. Some risks, we see coming. But there are also certainties hurtling our way that we fail to notice. The dinosaurs failed to anticipate the meteoroid that extinguished them. But dinosaurs didn't create their own calamity. Many others don't deserve the calamities we're creating.

We're borrowing heavily from people not yet born. Meanwhile, the framework with which we run our lives and our world — our philosophy, ethics, religion, and economics — can't seem to detect the risks we're running.

So, how to proceed? I've come to see that the geometry of human progress is an expanding circle of compassion. And that nature and human dignity require each other. And I believe that — if the word "sacred" means anything at all — the world exists as the one truly sacred place.

Excerpted from Carl Safina's *View from Lazy Point*. Published by Henry Holt and Company, 2010. Prelude.



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Aquanews is available on-line at <http://aquafishcrsp.oregonstate.edu/aquanews.php>. Past issues may also be accessed online at aquafishcrsp.oregonstate.edu/AquaNewsArchives.php

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

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Aquanews Editors: Stephanie Ichien, *Aquanews* Staff;
and Chelsea Stephen, Graduate Student

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