

AQUANEWS



*Sustainable Aquaculture
for a Secure Future*

POND DYNAMICS/AQUACULTURE COLLABORATIVE RESEARCH SUPPORT PROGRAM NEWSLETTER

Volume 14, Number 3/Summer 1999

www.orst.edu/dept/crsp/homepage.html

ISSN 1062-4996

Aquaculture Outreach at the Asian Institute of Technology—A Decade of Experience

by C. Kwei Lin, Aquaculture and Aquatic Resources Management Program, AIT

As an international institute for post-graduate degree education and research, most of the teaching and learning at the Asian Institute of Technology (AIT) is formal and campus-based. This “ivory tower” style of education is often detached from the practical knowledge relevant to problem solving and the skills needed for developing countries in Asia. To address the issues facing developing countries, AIT has gradually pursued outreach activities through off-campus research and extension in collaboration with governmental, nongovernmental, and private organizations.

The Aqua Outreach Program (AOP) of the Aquaculture and Aquatic Resources Management

Program (AARM) has been a successful model at AIT and beyond. AOP was launched in 1988 in collaboration with the Royal Thai Department of Fisheries at its Udorn Thani Freshwater Fisheries Development Center in Northeast Thailand. The outreach effort was initially sponsored by the Department of International Development of the British Government, which had previously supported AITs on-campus academic teaching and research in aquaculture. Outreach was thought to be the best method for the dissemination of results of on-station strategic research to users in the region. Throughout the last decade, outreach activities have been

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EXTENSION

To maximize the effectiveness of aquaculture extension, most of AITs activities are coordinated with already established extension networks of national and provincial institutions or NGOs. For instance, to promote PD/A CRSP pond fertilization technologies in Thailand, AIT offered seminars to approximately 100 research biologists and extension officers at the Royal Thai Department of Fisheries (DOF). The recommended fertilization scheme was then field tested at six of the DOFs provincial stations. After testing, adjustments were made to the fertilization scheme and the fertilization methods were adopted by farmers. Most farmers who followed the recommendations doubled or tripled their fish production.

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Kwei Lin

Water quality analysis in reservoir for cage culture of grass carp in northern Vietnam

Graduate Student Profile: Frances Tain

by Matt Niles

Frances Tain recently completed her Master's thesis, entitled "Impacts of Aquaculture Extension on Small-Scale *Oreochromis niloticus* Production in Northeastern Thailand," at the University of Michigan. Her thesis was the product of research Tain undertook while living in Thailand from June to September 1998 (see sidebar, page 3).

Originally from Los Angeles, California, Tain received her Bachelor's degree in Aquatic Biology from the University of California, Santa Barbara. She discovered the PD/A CRSP while at the University of Michigan through her advisor, Jim Diana, who began his own involvement with the CRSP at the CRSPs inception in 1982.

The summer Tain spent in Thailand last year wasn't her first visit to Thailand. Fascinated by living and working there, she enjoyed two previous visits to Thailand. So when Jim Diana informed her of the opportunity to pursue her Master's research at the Asian Institute of Technology (AIT), she welcomed the opportunity.

Tain wanted to work with small-scale aquaculturists—to find out who



Recent Master's degree recipient Frances Tain

they are, how they manage their enterprises, and what factors encouraged or discouraged them from fish farming successfully.

"I was interested in whether farmers are using current aquaculture technology, and if so, why, and how quickly and via what extension channels technology is reaching farmers."

Tain had worked previously with fisheries extension work while she was in the Peace Corps in Nepal. She did not work specifically in research-related activities, but she did learn a lot about aquaculture in tropical Asia, and it was her first real exposure to

aquaculture as it is happening in the field.

"I saw firsthand what sorts of external factors impact a fish farmer's motivation and success. I understood very quickly that fish farming does not happen in a vacuum, and that poor farmers don't have a lot of ability to access information, invest capital, or assume risk. Therefore, just because they're not producing at high levels, it doesn't mean they're not trying or that extension is failing."

During her summer in Thailand, Tain worked mainly with the Asian Institute of Technology's Aqua Outreach Programme (AOP). Besides providing a tremendous amount of support, according to Tain, the AOP has produced some very high quality extension materials and is a highly effective outreach unit.

Tain also witnessed firsthand other CRSP research currently underway at AIT, including the Thailand Global Experiment, and she feels that the CRSPs relationship with AIT, particularly the AOP program, is very important.

"I think extension is crucial from an aquaculture standpoint, as the technology coming from the universities is inaccessible to local farmers. Therefore, I feel that CRSPs support of both AIT and AOP programs is really benefiting not only Thai farmers but potentially small-scale fish farmers around the world."

Tain enjoyed living and working in Thailand. She had her own house, her own bike, a nearby park with a reservoir filled with giant catfish and carp, and two vicious, rabid dogs living around the corner.

Now that her thesis is completed, Tain wants to live and work in southeast Asia, and would like to continue working in aquaculture outreach as it relates to development issues such as food security, income generation, and rural community building. She has sought opportunities to work for AOP, perhaps at their Laos or Vietnam outreach offices. All job offers are welcome, she says, so don't hesitate to send them in to the PMO for forwarding. 📧



Frances Tain with a farmer in Thailand

PD/A CRSP Director Visits Thailand

by Matt Niles

PD/A CRSP Director Hillary Egna traveled to Thailand recently to attend the Joint FAO/NACA Expert Consultation for the Development of a Regional Collaborative Programme on Sustainable Aquaculture for Rural Development (SARDev). Held from 29-31 March, the meeting took place in the northeast Thailand city of Chiang Rai.

Invited by FAO to the three-day meeting, Egna presented a paper with CRSP researcher Dr. C. Kwei Lin entitled "The Pond Dynamics/Aquaculture CRSP: Developing Technologies and Networks for

Sustainable Aquaculture and Rural Development."

Egna concentrated on keys to effective collaboration, organizational behavior, and institutional sustainability. Kwei Lin focused on experimental results in pond dynamics that might be of interest to regional groups. Both were well received and responded to many questions from other attendees, and there was significant programmatic interest in the activities of the CRSP.

Few women participated in the meeting, and traditionally there has been low representation of



Hillary Egna

Tilapia being sold at a market in Thailand

women at FAO in general. That is one reason Egna was invited and why she felt it was important to go. It was also an excellent opportunity for the CRSP to increase its integration with the regional activities of FAO in southeast Thailand.

Following the meeting, Egna spent a day at the Asian Institute of Technology where she met Amrit Bart, the CRSP's new host country Principal Investigator.

Egna's Thailand visit was therefore a great way to strengthen links among the CRSP, AIT, FAO, and other organizations in the area. 📹



Hillary Egna

CRSP researchers Kwei Lin and Yang Yi

Impacts of Aquaculture Extension on Small-Scale *Oreochromis niloticus* Production in Northeastern Thailand *(excerpted from the abstract of Frances Tain's thesis)*

Small-scale aquaculture is already a significant source of food security, employment, and income generation for some rural poor in developing nations. Current statistics reveal, however, that the great majority of Third World inhabitants do not presently enjoy these benefits. Much technical knowledge of aquaculture management currently exists, but transfer of these technologies to a target group like small-scale culturists in the Third World sometimes remains problematic.

The objective of this study was to identify which extension techniques are most effective at communicating high-input inorganic fertilization (HIG) technology to small-scale, Nile tilapia (*Oreochromis niloticus*) farmers in northeast Thailand. Informal, one- or two-day trainings were as effective at transferring HIG technology as intensive 6-month on-farm trials, and both of these types of extension were more effective than farmer-to-farmer communication ($P=0.007$). No farmer group demonstrated a high

level of HIG technology adoption, although trialists did show technology retention over a two or three year period. Likely related to low levels of HIG adoption, group fish yields were significantly lower than HIG projected yields across all farmer groups. This suggested that extension methodology is not the only factor affecting fish production in this system. Other factors like farmer attitudes, quality of farmer-to-extensionist relationship, fertilizer price, local market conditions, and farmer predisposition to risk all may affect fish production.

Gonzalo—but Not Forgotten

by Deb Burke

The PD/A CRSP would like to extend its best to former CRSP Peru Host Country Project Leader Gonzalo Llosa, who left the Instituto de Investigaciones de la Amazonia Peruana (IIAP), and consequently the CRSP, in February 1999 to work with Conservation International (CI). Llosa is the new Projects Director in Peru; he had worked with CI back in 1995 and developed a short-term research project along the Malinowski River to study the impact of gold mining on the surrounding ecosystem.

As Project Director Llosa is responsible for evaluating existing projects and developing new projects for CI. CI works to protect the environment of areas of megadiversity, that is, zones of high biological diversity such as the Amazon region and specifically the Tropical Andes. Through participatory processes with the people living in areas of megadiversity, CI develops strategies and actions for the sustainable use of resources.

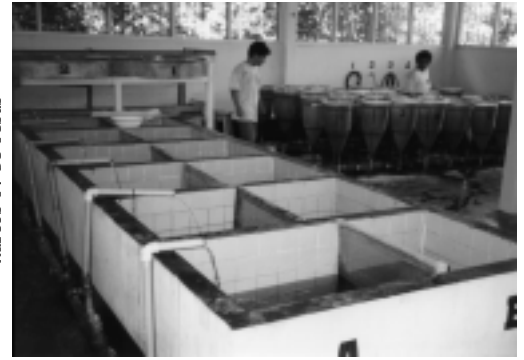
Llosa finds his work with CI quite exciting and multifaceted: “Last week I was visiting our organic coffee project, walking in the jungle, observing the plants, talking with the farmers, knowing their real problems. Yesterday I was in a meeting with the decision makers [at the national level] discussing the National Protected Areas law. This explains why this job is so exciting for

me.” Llosa can now bring his technical expertise and field knowledge to bear on policy development.

According to Llosa the aims of the PD/A CRSP blend well with the work he is doing at CI: “The sustainable use of resources is one of the strategies of CI. And aquaculture is one of the most interesting practical approaches” for using natural resources sustainably.

While working with the CRSP at IIAP, Llosa, who at the time was Director of Aquatic Ecosystems, developed the baseline study for aquacultural research. The study examined the culture of native Amazonian fishes and explored aquaculture as a whole activity. Not only did the CRSP study address production issues, it also considered the commercial and market aspects of aquaculture and the needs of farmers. Additionally, Llosa was involved with the Peruvian Ministry of Fisheries planning group who developed the strategic plan for aquaculture in the Amazon region.

Llosa is greatly concerned with the well-being of Peruvian farmers and asserts the importance of directing time and money to research that specifically focuses on the realities of the farmers. In terms of the effects of the CRSP, Llosa felt that the most important research that had taken place involved a visit by Joe Molnar, CRSP researcher involved with the social and economic aspects of aquacultural research.



Marcos J. De Jesus
Hatchery facilities at the IIAP research site include broodstock tanks, egg incubators, and larvae-rearing circular tanks

Molnar’s work included direct contact with area farmers in order to learn firsthand about their concerns and challenges.

Llosa believes that aquaculture has the potential to positively affect Peru and other developing countries. “For my country, and perhaps, for other developing countries, aquaculture can play a very important social role, giving the farmers a chance to change their bad conditions when they sell their products, in terms of direct food supply and economic incomes. This is obvious. The way to do this still must be discussed.”

Llosa received his undergraduate degree in biology from Brasilia University. After completing his biology degree, he studied Marine Ecosystems/Oceanography at the University of Paris, France, where for his graduate work he studied the ecological impacts of the El Niño phenomenon along the Peruvian Coast using meteorological satellite images.

CRSP Update—Goings-On in the Pond

compiled by Deb Burke

To keep readers posted on the goings on in the CRSP pond, we thought we would highlight the program’s activities over the last several months.

Recent Accomplishments of CRSP Program Participants

We would like to congratulate Philippines Host Country Principal Investigator Remedios Bolivar on being named Deputy Director of the Freshwater Aquaculture Center at Central Luzon State University.

Claude Boyd, Auburn University, received the Creative Researcher Award from the Vice President of Auburn University.

Institution Building

In Kenya, CRSP researchers Bethuel Omolo and Karen Veverica continue to strengthen relations with the Mt. Kenya Fish Farmer’s Association (KFFA) through meeting attendance, advice, and support. The KFFA is currently exploring the possibility of using association membership fees to

buy a seine net for fish harvests and to provide a contribution to the transport costs for fish culture training sessions to be held at Sagana Fish Farm by the CRSP.

Bernard Meso and Daniel Oenga, graduate students who are involved with CRSP research in Kenya, submitted proposals to conduct on-farm trials of integrated fish/horticulture systems in the Central Province with FARMESA, a Swedish nongovernmental organization.

In Thailand, institutional connections were maintained with the Network for Aquaculture Centers in

Welcome Salvador Tello—New Project Leader in Peru

by Deb Burke

Welcome Salvador Tello! Tello joined the CRSP in February 1999 as the new Peru Project Leader, succeeding former Project Leader Gonzalo Llosa, who now works with the Conservation International Foundation. Tello was born in Iquitos, Peru, a place he describes as “a beautiful city of 350,000 inhabitants, located in the middle of the Peruvian Amazon, and surrounded by rivers and plenty of fishes.”

Aquaculture has been a passion for Tello for quite some time, as evidenced in his comment: “When I was a kid I used to breed ornamental fishes in aquariums.” Accomplishments related to aquaculture for Tello include a graduate degree in fisheries engineering from Villarreal State University in Peru. In 1998 he defended the thesis “Analysis of a multispecies fishery: The commercial fishery fleet of Iquitos, Amazon Basin” to obtain an MS in fisheries biology from Oregon State University.

Future work for Tello will involve the exploration of the semi-intensive cage culture of native fishes in black water lagoons or varzea lakes. (Varzea is the inundation forest formed in the floodplains of sediment-rich Amazonian rivers. Lakes within the varzea harbor diverse aquatic fauna and are noted for their high productivity and biomass in comparison with other Amazonian aquatic habitats; source:

www.peterah.demon.co.uk/into_amaz.htm.) This extensive habitat is one of the most important in the world in terms of the diversity and abundance of fish that it supports. Due to the seasonality of the Peruvian Amazon fishery, there are periods of scarcity of riverine populations of native fishes. Tello hopes that the cage culture of native species will provide an economical and ecologically sound option to the harvest of riverine populations and satisfy the market demand for native fishes.

While attending Oregon State University, Tello became familiar with the work of the PD/A CRSP, which formally collaborates with two institutions in Peru—Universidad Nacional de la Amazonia Peruana (UNAP) and the Instituto de Investigaciones de la Amazonia Peruana (IIAP)—through the mechanisms of a three-way Memorandum of Understanding with Southern Illinois State University at Carbondale, a CRSP partnership institution. When Tello returned to Peru after completing his degree at OSU, he began work as the head of the Aquatic Ecosystem Program at IIAP. Through his work at IIAP he became actively involved in CRSP research. Previously, Tello worked with Dr. Fernando Alcántara, a PD/A CRSP co-Principal Investigator in Peru, on a study titled “Development of sustainable pond

aquaculture practices for *Piaractus brachyomus* in the Peruvian Amazon,” and currently he is involved with CRSP research into the spawning and grow-out of *Colossoma macropomum* and/or *Piaractus brachyomus*.

In the last 20 years Peruvian marine aquaculture has grown more quickly than freshwater aquaculture, whose development has been slowed by under-investments in new technologies and a lack of market research on freshwater species like *Colossoma* and *Piaractus*.



IIAP crew seining for *Colossoma macropomum* at the CRSP research site in Peru

Having said that, Tello is expectant that the IIAP-CRSP partnership will make sustainable aquaculture in the Amazon region around Iquitos possible; the goals and objectives of IIAP's ACUIPRO Project are well aligned with the aims of CRSP research. Tello anticipates that at the end of this year, a manual about the pond culture of *Colossoma* and *Piaractus* will be available. The manual

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the Asia Pacific (NACA) and the Thailand Department of Fisheries. Claude Boyd, CRSP researcher from Auburn University, met with members of the Thailand Department of Fisheries to discuss environmental issues related to aquaculture and assisted with the preparation of a Code of Conduct for Thai shrimp farming.

Wilfrido Contreras, a CRSP researcher who is both Ph.D. student at Oregon State University and Professor at the Universidad Juárez Autónoma de Tabasco (UJAT), made contact with several professors from

the Universidad Autónoma Metropolitana (UAM) and the Instituto Politécnico Nacional in Mexico to discuss the potential for using alternative steroids for masculinization of tilapia. Professors from the Instituto Politécnico Nacional expressed an interest in collaborating with the CRSP on a study that examines the fate of steroids in sediments.

Linkages

Sagana Fish Farm, the PD/A CRSP prime site in Kenya, is both a demonstration facility and an aquacultural research site. Recently, the Department

Head of Fisheries from Moi University and two architects visited Sagana Fish Farm to obtain information and guidance on pond and hatchery design and construction for their own station.

The Information Management and Networking Component (IMNC) was present at Oregon State University's Earth Day Celebration. The IMNC hosted a booth that received approximately 100 visits, distributing PD/A CRSP information materials and tilapia recipes. Additionally, visitors had the opportunity to have their pictures taken behind a glittering

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Aquaculture Outreach

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further strengthened and expanded in scope and geography as a result of wider collaboration with other international partnerships, notably the PD/A CRSP, the Danish International Developmental Agency, the Swedish International Development Agency, and the International Development and Research Center of Canada. Each funding agency has focused on a specific research and/or outreach effort, such as seed production, nutrition, pond dynamics, wild fish, and curriculum development.

The AOP mission is "to achieve wider recognition of the importance of aquatic resources to rural livelihoods and to mobilize efforts to improve their management to benefit the poor."

Over the years, AOP has tried to expand recognition of the development process following a systematic framework and participatory organization (see diagrams). Currently, the outreach work involves at least 12 network institutions in Thailand, Lao PDR, Cambodia, and Vietnam. The institutions are mainly provincial departments, national research

institutes, universities and agricultural colleges, and NGOs.

Over time outreach has developed a process-oriented approach to transfer the technologies resulting from on-station research to rural locales. For example, CRSP pond fertilization guidelines have now been widely applied or modified by small-scale farmers in Thailand and Vietnam through the extension networks of national organizations. AITs student thesis research also plays an important role in either

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Feedback loops within and between the AIT Outreach Resources and Coordinating Office, outreach generic activities, and Outreach Field Offices



The AIT Aquaculture Outreach process

EDUCATION AND TRAINING

AITs aquaculture outreach program has strengthened the teaching and research capabilities among its outreach partner institutions of Indochinese countries. In Vietnam, for example, more than 20 AIT alumni play key roles in aquaculture development through Cantho University, the National University of Ho Chi Minh, the Research Institute for Aquaculture (RIA) Nos. 1 and 2, and Agricultural University of Hanoi, and the University of Fisheries in Nhatrang.

AIT alumni who have been involved in AITs outreach projects are the backbone of national aquaculture institutions and now are broadening their reach and seeking additional international linkages and support. This is particularly evident at Cantho University and RIA No. 1. A large number of AITs outreach partners and alumni actively participate in regional and international conferences. At a recent Asian Fisheries Society Forum in Chiang Mai, Thailand, more than 70 alumni and outreach associates were present, representing about 10% of the total participants at the Forum.



Peter Edwards

Visiting fish farmers in northeastern Thailand

Aquaculture Outreach

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developing appropriate technologies or conducting field trials in host countries. Technical services, administrative support, and coordination of the outreach network involve a series of service providers, including AARM faculty and staff and international, regional, and national expertise that is funded by donor agencies.

AOP coordinator Dr. Harvey Demaine believes that the AIT outreach approach will be propagated by its partner institutions through horizontal spread, which creates "networks" between provinces in Thailand and the Lao PDR, and through the development of networks by national institutions to serve their provincial clients, mostly in Vietnam.

AOPs future plans will continue to primarily focus on strengthening the capacity of institutions and individuals, extending its outreach efforts from the local to the national level throughout Southeast Asia. 🐟



Kwei Lin

Fish sampling in CRSP-recommended "green ponds" for tilapia culture

Mexico is Newest CRSP Host Country Partner

Collaborative research underway between Oregon State University and the Universidad Juárez Autónoma de Tabasco for several years has now been formalized under the newest PD/A CRSP Memorandum of Understanding. In place as of 2 June 1999, the new MOU is accompanied by a second agreement, a "Specific Joint Authority," that outlines the research in Reproduction Control and Effluents by scientists in OSU's Department of Fisheries and Wildlife and UJAT's School of Biological Sciences.

INFORMATION DISSEMINATION

To increase the dissemination of aquaculture educational and extension materials, AITs outreach Information and Promotion Unit (IPU) has assisted in building the communication capabilities of technical colleges and universities. Each of AITs partner institutions is now equipped with electronic facilities that enable them to communicate via the Internet. AIT is also developing a distance education system that links its outreach partner institutions to AIT. AITs IPU and shortcourse training staff often conduct integrated training courses on extension strategies. IPU has also produced a series of outreach working papers and extension materials.

CRSP Goings-On

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tilapia placard; the pictures were placed on the PD/A CRSP website to increase the program's visibility on the Web and students' awareness of the CRSP's electronic resources.

The Central Database has proven to be another mechanism for developing CRSP links. Doug Ernst, Central Database Manager, receives requests for information from the public approximately once per week. During a one-year period from May 1998 to May 1999, the Central Database received 1,400 hits. Most queries came from junior high and high school

students regarding small-scale aquaculture systems used for educational purposes. Ernst also receives specific questions about pond management related to algae control problems.

CRSP researchers in Peru received assistance from regional fishermen, who, with authorization from the Peruvian Ministry of Fisheries, collected wild Gamitana fingerlings to supplement the number of hatchery-produced study fish used for experimental purposes.

Conferences and Workshops

Four Kenyan graduate students presented CRSP research results at the

conference Shallow Water Bodies in the Tropics: Patricia Mwau, Paul Bilal Izaru, Daniel Oenga, and Wilson Maina Gichuri.

CRSP researchers from Thailand, the Philippines, Peru, and the US attending the World Aquaculture Society (WAS) Meeting in Sydney, Australia, included Chris Kohler, Southern Illinois University-Carbondale, William Shelton, University of Oklahoma; Ronald Phelps, Auburn University; Chris Brown, University of Hawaii; James Diana, The University of Michigan; and Yang Yi and Kwei Lin, Asian Institute of Technology. 🐟

PD/A CRSP Technical Committee

A recent election among PD/A CRSP principal investigators has revamped the membership on the Technical Committee. The new TC composition is shown here.

TECHNICAL COMMITTEE

Bill Shelton University of Oklahoma, Co-chair
John Bolte Oregon State University, Co-chair

Materials & Methods Subcommittee

Carole Engle University of Arkansas, Pine Bluff
Claude Boyd Auburn University
Doug Ernst Oregon State University

Technical Progress Subcommittee

Joe Molnar Auburn University
Shree Nath University of Georgia
Yang Yi Asian Institute of Technology, Thailand

Work Plan & Budget Subcommittee

Kevin Fitzsimmons University of Arizona
Tom Popma Auburn University
Salvador Tello Instituto de Investigaciones de la Amazonia Peruana,
Peru

External At-Large Member

Marc Verdegem Wageningen Agricultural University, The Netherlands

Research Support At-Large Member

Marion McNamara Oregon State University

Ex-Officio Members

Harry Rea USAID
Hillary Egna Oregon State University
Cormac Craven Oregon State University

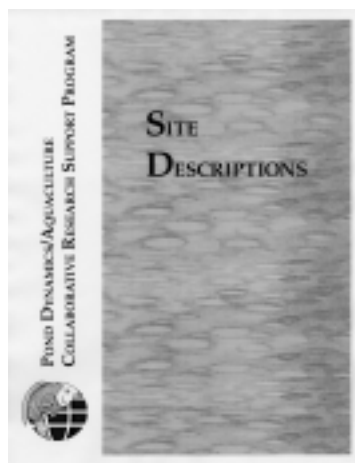
EdOp Net Online

EdOp Net has come a long way since the first issue in October 1996. With a mailing list of over 200 subscribers, EdOp Net has grown into a great resource for PD/A CRSP participants and others interested in current educational and employment opportunities in aquaculture and fisheries in general around the world. Among the improvements to EdOp Net is an online version, which allows users to view all active opportunities with a couple of mouse clicks. So come and check out our web site, www.orst.edu/Dept/crsp/edops/edop.html. To subscribe electronically to EdOp Net, contact Matt Niles at nilesm@ucs.orst.edu. 🐟



Site Descriptions Available

A new publication describing PD/A CRSP research sites in Africa, the Americas, and Asia is now available. Information on 14 sites in nine countries includes site locations; regional descriptions of climate, topography, and geology; site maps; pond, laboratory, and water supply information; support facilities; and in-country and US contacts. The 84-page booklet replaces *Pond Dynamics/Aquaculture Collaborative Research Data*



Reports, Volume 1, General Reference: PD/A CRSP Site Descriptions, the second edition of which appeared in 1996. In addition to updating information on earlier editions, the new publication contains descriptions of new sites at the Instituto de Investigaciones de la Amazonia Peruana in Peru and at Sagana Fish Farm in Kenya. *Site Descriptions* will be available on the CRSP website by October 1999. Ordering information for hard copies of this and other CRSP publications is listed on page 9. 🐟

Second Addendum to the Eighth Work Plan Available

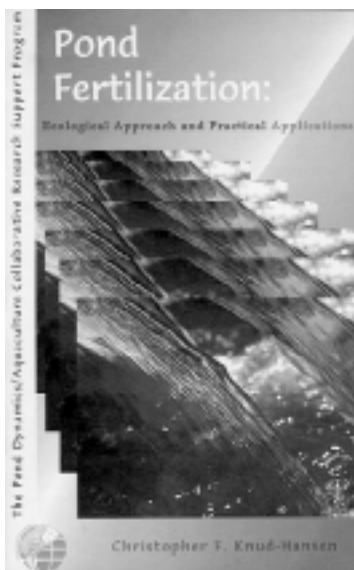
A new addendum to the Eighth Work Plan is currently available from the PD/A CRSP. This Second Addendum contains changes to Eighth Work Plan activities implemented since the publishing of the first Addendum in Spring 1998, which, like the Second Addendum, contained official changes relating to schedules and/or methods to the work plans as described in the Eighth Work Plan.

The *Second Addendum to the Eighth Work Plan* contains approved work plan revisions for Eighth Work Plan investigations and may be most useful when consulted in conjunction with the *Eighth Work Plan* and the *Addendum to the Eighth Work Plan*. One work plan, "The influence of fish culture technology, extension methodology, and socioeconomics on success of fish culture on limited-resource farms" (study code ADR2; p. 12), appears here for the first time. Subsequent addenda, if any, will be published annually.

To receive a copy of the *Second Addendum to the Eighth Work Plan*, contact the CRSP via email at crsp.mail@orst.edu or at the address listed on page 8. 🐟

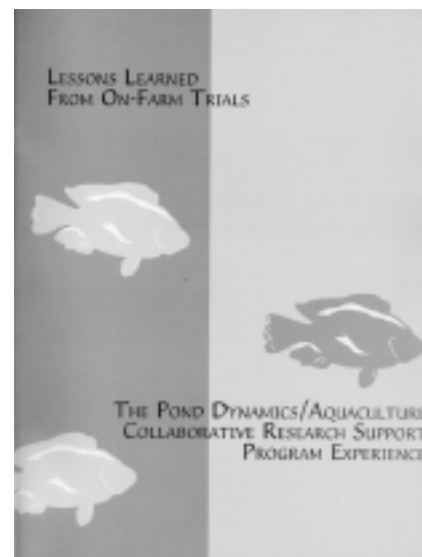
Plethora of Publications on the PD/A CRSP Web Pages

Many CRSP publications (including *Aquanews*, starting with the Spring 1996 issue) can be viewed or downloaded from the PD/A CRSP website, at www.orst.edu/dept/crsp/pubs/publications.html. Work plans, notices of publication, Annual Technical and



Administrative Reports (starting with the Twelfth), Global Experiment literature, and CRSP-published research reports are available in HTML or Acrobat format.

Other CRSP publications are also available, such as *Pond Fertilization: Ecological Approach and Practical*



Applications, a 125-page report that provides an approach to pond fertilization incorporating years of PD/A CRSP pond dynamics and fertilization research in a form designed to be understood by regional extension workers, educated farmers, aquaculture students, and scientists. The fertilization guide was published in September 1998 and is now available at the PD/A CRSP website. *Lessons Learned from On-Farm Trials: The PD/A CRSP Experience*, also available at the CRSP site, is an 83-page report containing five case studies of PD/A CRSP on-farm trials in Honduras, Thailand, the Philippines, and Rwanda. 🐟

Matt's Steamed Tilapia

Ingredients:

Whole tilapia, cleaned and scaled	1 clove of garlic, minced
2 T peanut oil	1 T fresh grated ginger
2 strips of bacon, diced	1 cup soy sauce
1/4 cup each of chopped green and yellow onions	

Instructions:

Clean and scale whole tilapia (leave on the head), and steam in an elevated rack for 15-20 minutes or until cooked. While fish is steaming, saute bacon until crispy, then add yellow onions, garlic, and ginger. Saute for 3-5 minutes, add soy sauce, and remove from heat. In a small sauce pan, heat peanut oil just to the point of smoking. Remove tilapia from steamer, pat dry, and place on a serving platter. Pour hot oil over the whole fish, using caution to avoid spattering. Spoon bacon, onion, garlic, ginger, and soy sauce mixture over fish. Sprinkle with green onions and serve over a bed of rice.

Recipe courtesy of Matt Niles

Upcoming Conferences and Expositions

Date	Topic/Title	Event Location	Contact Information
August 7- 10, 1999	Aquaculture Europe '99	Trondheim, Norway	Stiftelsen Nor-Fishing, Nidarohallene, N-7030 Trondheim, Norway; Phone: 47-73-92-93-40; Fax: 47-73-51-61-35
August 11- 14, 1999	AquaNor '99	Trondheim, Norway	Stiftelsen Nor-Fishing, Nidarohallene, N-7030 Trondheim, Norway; Phone: 47-73-92-93-40; Fax: 47-73-51-61-35
August 17-20, 1999	V Central American Symposium on Aquaculture	San Pedro Sula, Honduras	John Cooksey; Phone: 425-483-6682; Fax: 425-483-6319; Email: worldaqua@aol.com
September 13-16, 1999	ICES Symposium on the Environmental Effects of Mariculture	New Brunswick, Canada	Dr. D. J. Wildish, Dept. of Fisheries and Oceans, Biological Station, St Andrews, N.B., Canada E0G 2X0; Email:wildishd@mar.dfo-mpo.gc.ca
October 28-30, 1999	V Ecuadorian Aquaculture Conference	Guayaquil, Ecuador	CENAIM-ESPOL Foundation, PO Box 09-01-4519, Guayaquil, Ecuador; Phone: 593-426-9495/494; Fax: 593-426-9492/456; Email: Ischwarz@espol.edu.ec
November 3-5, 1999	Feed Ingredients and Grain Processing Asia '99	Bangkok, Thailand	Victam International, BV, PO Box 197, 3860 AD Nijkerk, Netherlands; Phone: 31-033-246-4404; Email: expo@victam.com
November 17-20, 1999	Aquaculture Venezuela '99	Puerto La Cruz, Venezuela	WAS Conference Manager, World Aquaculture Society, 21710 7th Place West, Bothell, WA 98021; Phone: 425-485-6682; Fax: 425-483-6319; Email: worldaqua@aol.com
February 1-4, 2000	Aquaculture America 2000	New Orleans, Louisiana, USA	WAS Conference Manager, World Aquaculture Society, 21710 7th Place West, Bothell, WA 98021; Phone: 425-485-6682; Fax: 425-483-6319; Email: worldaqua@aol.com
May 2-6, 2000	World Aquaculture 2000	Nice, France	WAS Conference Manager, World Aquaculture Society, 21710 7th Place West, Bothell, WA 98021; Phone: 25-485-6682; Fax: 425-483-6319; Email: worldaqua@aol.com
July 20-23, 2000	Third International Conference on Recirculating Aquaculture	Roanoke, Virginia, USA	Dr. George Libey, Recirculating Aquaculture Conference 2000, Virginia Tech, Blacksburg, VA 24061; Phone: 540-231-6805; Fax: 540-231-9293; Email: CFAST@vt.edu
January 21-25, 2001	Aquaculture 2001	Orlando, Florida, USA	WAS Conference Manager, World Aquaculture Society, 21710 7th Place West, Bothell, WA 98021; Phone: 425-485-6682; Fax: 425-483-6319; Email: worldaqua@aol.com

Hello Tello

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will address a wide range of topics, from the breeding of *Colossoma* and *Piaractus* species to the optimal marketing of products (e.g., providing smoked or dried fish) in the national and international arena, and also include an economic study.

Tello views the exchange of knowledge related to pond culture between US and Peruvian scientists as an excellent opportunity to "increase our understanding of the biology and pond culture of fish species from the Amazon." This increased understanding will allow for improved pond culture techniques and increased production of native Amazonian species, which will in turn benefit the human population by increasing protein intake through the consumption of fish and providing income to families and communities. 🐟

CRSP Co-Sponsoring Honduras Symposium

The V Central American Symposium on Aquaculture, produced by ANDAH and the Latin American Chapter of WAS, will be held in San Pedro Sula, Honduras, 18–20 August 1999. Three full days of conferences, exhibits, and receptions are planned, with presentations on shrimp and tilapia production including nutrition, diseases and pathology, larval culture, culture systems, water quality, effluents and environment, genetic selection, and processing. Among the invited speakers are CRSP researchers Claude Boyd and

George Ward. There will be tours of shrimp and tilapia farming operations after the symposium ends.

Additional information and registration forms are available on the Internet at www.was.org/confer/honduras/meeting.htm, via email at worldaqua@aol.com or andah@honndutel.hn, or by writing to:
 V Symposium USA
 WAS
 21710 7th Place West
 Bothell, WA 98021
 or:
 V Simposio—Honduras
 ANDAH
 Pasaje Sarita Rubenstein
 Apartado Postal 220
 Choluteca, Honduras 🐟



Workshops and Short Courses

Date	Title/Topic/Site	Contacts
Year-round	Work Experience in Hatcheries Techniques/ Asian Institute of Technology, Thailand	Training and Consultancy Unit, Aquaculture and Aquatic Resources Management Program, School of Environment, Resources, and Development, Asian Institute of Technology, PO Box 4, Klong Luang, Pathumthani 12120, Thailand; Phone: 66-2-524-5445; Fax: 66-2-524-5484; Email: tcuaasp@ait.ac.th
Year-round	Training and Research in Fisheries and Stock Management/Wageningen Agricultural University, the Netherlands	G. van Eck, Dept of Fish Culture & Fisheries, PO Box 338, 6700 AH Wageningen, The Netherlands; Phone: 31-8370-8330; Fax: 31-8370-83937; Email: gerrie.van.eck@alg.venv.wau.nl
Year-round	Tropical Aquaculture Advanced Training in a Third World Country/Escuela Agricola Panamericana (EAP), Honduras, and Asian Institute for Technology, Thailand	Zentralstelle fuer Ernährung und Landwirtschaft (ZEL) Feldafing / Zschortau, Deutsche Stiftung fuer Internationale Entwicklung (DSE), D-82336 Feldafing, Germany; Phone: ++49-8157-38-0; Fax: ++49-81-57-38-227
July 11-17, 1999	Aquaponics and Tilapia Aquaculture Short Course/University of the Virgin Islands, St. Croix, Virgin Islands	Dr. James Rakocy, RR 2, Box 10,000, Kingshill, Virgin Islands 00850; Phone: 340-692-4020; Email: jrakocy@uvi.edu
July 19-30 and July 19-August 6, 1999	Practical Aquaculture Techniques Short Course/Aquaculture Center for Training, Education, and Demonstration (ACTED), Harbor Branch Oceanographic Institution, Fort Pierce, Florida	ACTED; Phone: 800-333-4264 or 561-465-2400 ext. 416; Fax: 561-466-6590; Email: acted@hboi.edu; Internet: <www.hboi.edu/aquaculture/acted.html>
July 20-24 and November 8-12, 1999	Recirculating Systems Short Course/Aquaculture Center for Training, Education, and Demonstration (ACTED), Harbor Branch Oceanographic Institution, Fort Pierce, Florida	ACTED; Phone: 800-333-4264 or 561-465-2400 ext. 416; Fax: 561-466-6590; Email: acted@hboi.edu; Internet: <www.hboi.edu/aquaculture/acted.html>
August 25-27, October 28-30, and December 1-3, 1999	Opportunities in Aquaculture Workshop/Aquaculture Center for Training, Education, and Demonstration (ACTED), Harbor Branch Oceanographic Institution, Fort Pierce, Florida	ACTED; Phone: 800-333-4264 or 561-465-2400 ext. 416; Fax: 561-466-6590; Email: acted@hboi.edu; Internet: <www.hboi.edu/aquaculture/acted.html>
August 29-September 3, 1999	A Practical Short Course on Aquaculture Feed Preparation, Nutrition, and Feed Management	Dr. Mian N. Riaz, Food Protein R&D Center, Texas A&M University, College Station, Texas 77843-2476; Phone: 409-845-2741; Fax: 409-845-2744; Email: mnriaz@tamu.edu; Internet: <www.tamu.edu/food-protein>
September 8-15, 1999	Texas Shrimp Farming Short Course, Port Aransas, Texas	Sea Grant College Program Office, 1716 Briarcrest Suite 702, Bryan, Texas; Phone: 409-845-7524; Fax: 409-845-7525; Email: lpropes@unix.tamu.edu.
September 10 and November 6, 1999	Backyard Aquaculture Workshop/Aquaculture Center for Training, Education, and Demonstration (ACTED), Harbor Branch Oceanographic Institution, Fort Pierce, Florida	ACTED; Phone: 800-333-4264 or 561-465-2400 ext. 416; Fax: 561-466-6590; Email: acted@hboi.edu; Internet: <www.hboi.edu/aquaculture/acted.html>
September 19-October 22, 1999	HDNR Smithsonian Conservation Short Course: "Economic and Policy Solutions for Ecosystem Conservation"/Washington, D.C.	Christopher Ros c/o SI/MAB Program, Smithsonian Institution, S. Dillon Ripley Center, 1100 Jefferson Drive SW, Suite 3123, Washington, D.C. 20560-0705; Phone: 202-357-4793; Fax: 202-786-2557; Email: cjr@ic.si.edu; Internet: <www.si.edu/organiza/museums/ripley/simab/start.htm>
September 22-25, 1999	Aquaculture Marketing Seminar 1999/ Asheville, North Carolina	Aquaculture Magazine, PO Box 2329, Asheville, NC 28802; Phone: 828-254-7334; Fax: 828-253-0677; Email: aquamag@ioa.com; Internet: <www.aquaculturemag.com>
October 12-15, 1999	Aquaculture Business Planning and Management Short Course/Aquaculture Center for Training, Education, and Demonstration (ACTED), Harbor Branch Oceanographic Institution, Fort Pierce, Florida	ACTED; Phone: 800-333-4264 or 561-465-2400 ext. 416; Fax: 561-466-6590; Email: acted@hboi.edu; Internet: <www.hboi.edu/aquaculture/acted.html>
October 31-November 12, 1999	HDNR Smithsonian Conservation Short Course: "Smithsonian Environmental Leadership & Communication Course"/Washington, D.C.	Christopher Ros c/o SI/MAB Program, Smithsonian Institution, S. Dillon Ripley Center, 1100 Jefferson Drive SW, Suite 3123, Washington, D.C. 20560-0705; Phone: 202-357-4793; Fax: 202-786-2557; Email: cjr@ic.si.edu; Internet: <www.si.edu/organiza/museums/ripley/simab/start.htm>
December 6-10, 1999	Culture of Penaeid Shrimp Short Course/Aquaculture Center for Training, Education, and Demonstration (ACTED), Harbor Branch Oceanographic Institution, Fort Pierce, Florida	ACTED; Phone: 800-333-4264 or 561-465-2400 ext. 416; Fax: 561-466-6590; Email: acted@hboi.edu; Internet: <www.hboi.edu/aquaculture/acted.html>

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Aquanews is published quarterly by the Information Management Component of the Pond Dynamics/ Aquaculture Collaborative Research Support Program, Oregon State University, 400 Snell Hall, Corvallis OR 97331-1641.
<www.orst.edu/dept/crsp/homepage.html>

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The Pond Dynamics/ Aquaculture Collaborative Research Support Program is funded in part by the US Agency for International Development under CRSP Grant No. LAG-G-00-96-90015-00 and by participating US and Host Country Institutions.

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