

AQUANEWS



Sustainable Aquaculture
for a Secure Future

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Polyculture in Southeast Asia

by Kevin Fitzsimmons, University of Arizona

The Philippines, Vietnam, and Thailand were the stops on a recent trip made by University of Arizona PD/A CRSP researcher Kevin Fitzsimmons, whose focus was to examine tilapia-shrimp polyculture systems in all three countries. The trip was conducted in conjunction with collaborators Remedios Bolivar of Central Luzon State University (CLSU), located in Muñoz, Philippines, and Yang Yi of the Asian Institute of Technology, near Bangkok, Thailand. The trip was also timed to coincide with the International Forum on Tilapia Farming, held February 25 to 27 in Los Baños, Philippines.

Fitzsimmons and Bolivar were both involved with the forum. Fitzsimmons presented a paper entitled "Reuse of effluents from tilapia farms for growing irrigated crops and seaweeds." Rafael Guerrero, executive director of the Philippine Council for Aquatic and Marine Research and Development, was the organizer of the conference. Former CRSP researchers Tom Popma, Auburn University, and Bill Shelton, University of Oklahoma, were other invited speakers who presented results of PD/A CRSP projects.

Remedios Bolivar, Bong Bolivar, and Fitzsimmons visited two farms in

Bulacan Province that had experimented with tilapia-shrimp polyculture. One had switched to milkfish-shrimp polyculture, which they found to be more lucrative, while the other raised wild tilapia that had come in with source water. During the visit, one person was harvesting tilapia with a pellet gun—a new harvest method for all of us.

After the conference Remedios Bolivar and Fitzsimmons were invited to Negros Island to view a series of tilapia-shrimp projects. Franic Domingo and Ray Visitacion work within a cooperative of farmers on Negros who have adopted a tilapia-shrimp polyculture system that has been very successful. The system utilizes hapa net pens stocked with tilapia and placed in the center of the pond. Shrimp are stocked outside the hapas and paddle-wheels circulate water, which carries wastes to the center where they are consumed

by the fish. In addition, the reservoir pond at the head of the farm intake water supply is heavily stocked with tilapia. Domingo and Visitacion observe that the tilapia seem to maintain a favorable algae bloom in the system, encourage a beneficial bacterial community, and reduce the number of zooplankters. The incidence of disease in the polyculture



Oreochromis niloticus × *O. hornorum* cross used in ponds of 15 parts per thousand salinity.

ponds appears to be lower than in monoculture ponds. Members of the cooperative have also developed a branded tilapia with retail stores and a restaurant featuring their tilapia.

In Vietnam, Yang Yi and Fitzsimmons were invited to Can Tho University and met there with CRSP host country

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principal investigators Nguyen Thanh Phuong and Truong Quoc Phu. The group toured the tilapia-shrimp farming areas in the Mekong Delta but never actually found the tilapia-shrimp farms. It always seemed that the farmers doing it were “over that way.” However, they did manage to visit plenty of shrimp farms that were polyculturing milkfish and shrimp or rotating rice and shrimp. Can Tho University has an active extension service in

addition to the university education and research activities.

Vietnam’s tilapia industry will continue to grow, given its plentiful supply of high-quality water and large consumer base.

Red tilapia has become the fish of choice in this region and is found in most restaurants and grocery stores.

In Thailand, Yang Yi introduced the people working on the tilapia-shrimp polyculture project. These include two graduate students, Potjanee Nadtirrom, who is taking the lead on the survey of

farmers, and Wanwisa Saelee, who is conducting the pond trials. They both accompanied Fitzsimmons to visit tilapia-shrimp polyculture operations in three provinces in Thailand. The operations were implementing several techniques for polyculture with shrimp. These included cage culture, stocking in the

farm reservoir, and using the shrimp pond as a nursery for fry and fingerlings. They were using Nile tilapia, *Oreochromis niloticus*, in low-salinity water and a strain of red tilapia in the more saline locations.

Red tilapia strains are strongly marketed throughout the region. For example, the Charoen Pokphand (CP) Group, an agribusiness conglomerate, has developed a red strain called Tabtim, described on the company’s website as “a cross between the Nile tilapia, black Tilapia, and its Israeli, Florida, and Taiwanese cousins.” There is a strong advertising presence for the CP fish, with posters in grocery stores and restaurants. Renaming the red strains has become a successful marketing theme in Thailand, Vietnam, and China.

In all three countries, the red tilapia demands a 30 to 40% premium even though it tastes exactly the same as the darker-skinned tilapia.

Another new tilapia product that has become popular in the Philippines



Jewel tilapia retail outlet, the Philippines.

and Thailand is fried tilapia skins. With scales removed, the skin is cut into short narrow strips and then deep-fried. The final product looks and tastes vaguely like pork rind. It is served as a finger food snack, sometimes sprinkled with lime juice or with a slice of onion. Photos of these products and of farms and research locations visited are posted at <www.tilapia.org>.

These PD/A CRSP host countries—Philippines, Thailand, and Vietnam—continue to be world leaders in tilapia research, production, and consumption. The collaborations are contributing to the improvement of research



Tilapia cages in shrimp pond on Negros Island, Philippines.

and extension capacity and training of students. The amount of fish produced in these countries makes a significant contribution to food security and to the economic development in the region. 🐟



Long-arm paddlewheels in pond in Vietnam.

Goings-on in the Pond

The PD/A CRSP wishes **Tom Popma** all the best on his retirement. Popma, Auburn University Professor in the Department of Fisheries and Allied Aquacultures, retired from both Auburn and the PD/A CRSP at the close of the Ninth Work Plan. He had been a member of the Auburn faculty since 1977. During his first three years with Auburn and prior to the establishment of the PD/A CRSP, Popma worked on a USAID-funded aquaculture project in Colombia. He later joined the PD/A CRSP Rwanda Project in September of 1988. Over the past 14 years he also worked on CRSP projects in Honduras and Kenya. Popma's efforts and global dedication to aquaculture projects will be missed by the CRSP. We wish him luck in his future endeavors.



Tom Popma

We wish to welcome two new host country principal investigators to CRSP projects in Central America. **Suyapa Triminio de Meyer** from Escuela Agrícola



Suyapa Meyer

Panamericana (Zamorano University) in Honduras and **Agnes Saborío Coze** of Universidad Centroamericana in Nicaragua will be working with Carole Engle of University of Arkansas at Pine Bluff on several projects in marketing and food security.

The CRSP welcomes **Gwyn Newcombe**, coordinator for a new program initiative. Newcombe will be assisting with stakeholder and expert panel meetings in preparation for the program's next five-year grant proposal.

CRSP researcher **Christopher Knud-Hansen** visited Thailand from 25 January to 14 February 2002 to work on Tenth Work Plan projects at the Asian Institute of Technology. While there, he met with Eng-Leong "Jacky" Foo from the Integrated Bio-Systems Network, Royal Institute of Technology, Stockholm, Sweden, and Mr. Peter Guagliano, an advisor with the Training and Occupation for Disabled Association, Poi Pet, Cambodia. These two people were visiting AIT to gather information for a United Nations proposal they are developing regarding integrated farming systems for rural Cambodia. Knud-Hansen shared his CRSP-related research in his discussions with the pair, and some of his ideas may appear in the final proposal.

Claude Boyd, CRSP researcher from Auburn University, was invited to speak at a shrimp culture conference hosted by the Fisheries Department of

Madagascar, where he will be discussing environmental issues involved with shrimp culture.

CRSP researcher **Chris Brown** was a guest lecturer for a Biological Oceanography class at Florida International University. For the lecture, he used CRSP project data to illustrate basic principles of aquaculture nutrition, management, and research innovation.

Yang Yi, CRSP researcher at the Asian Institute of Technology (AIT), attended the 6th Asian Fisheries Forum, hosted by the Asian Fisheries Society, from 25 to 30 November 2001 at Kaoshiung, Taiwan, and presented three papers on tilapia culture, fertilization, and rice-fish culture in China. Additionally, during the forum Yi was elected as the councilor of the Asian Fisheries Society.

Kwei Lin, CRSP researcher at AIT, was invited to give a talk on pond water quality in shrimp culture at the Global Aquaculture Alliance Symposium in Singapore, 27 to 28 November 2001. Lin was also invited by the Asian Productivity Organization to present a paper entitled "Aquaculture in Thailand" at a meeting in Taiwan from 1 to 6 December 2001.



Kwei Lin

Bill Tollner, CRSP researcher from the University of Georgia, presented "Pond models: Hill-side and levee pond design" to 13 farmers, instructors, and NGO technicians on 15 February 2002 at Zamorano University, Honduras.

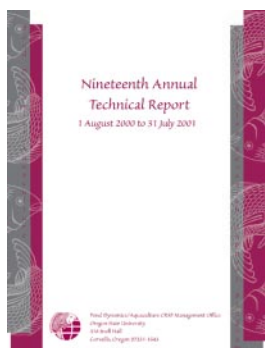
Jennifer Maldonado of the University of Georgia's New Media Institute presented "Web development role analysis" to five employees at Zamorano on 22 February 2002. 🐟

19th Technical Report Available

The wait is over! The brand new *Nineteenth Annual Technical Report* is now available for ordering or online viewing. Read up on all of the latest research in aquaculture done over the past year by your favorite CRSP researchers. Research areas include Pond Dynamics, Feeds

and Fertilizers, Reproduction Control, Effluents and Pollution, Marketing and Economic Analysis, Regional Analysis: Human-Environment Interactions, and much more. Log onto the PD/A CRSP website at <pdacrsp.orst.edu/pubs/annual_reports> to view online. Printed copies are also available upon request by email to mcelweek@ucs.orst.edu or from:

Publications
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CORRECTION

The author of the article "MSU: An Early Partner Rejoins the Team," which appeared on page 3 of the Winter 2002 issue of Aquanews was incorrectly identified. The actual author was Chris Knud-Hansen. We regret the error and any inconvenience it may have caused.

Graduate Student Profile: Elizabeth Trejos-Castillo

by Steve Sempier

Elizabeth Trejos-Castillo is one of the newest arrivals to the PD/A CRSP. She brings a unique background that will help facilitate CRSP research in Honduras. Trejos grew up in Costa Rica and completed her undergraduate degree at Iowa State University with a double major in psychology and English. Trejos and her husband, Pablo Rolando Martinez-Mejia, then moved to Honduras. While in Honduras Martinez worked at the Escuela Agrícola Panamericana (Zamorano), which hosts the CRSP Honduras Project.

Joe Molnar, a CRSP researcher from Auburn University, interviewed Martinez during a visit to Zamorano. During the interview Martinez told Molnar about Trejos's background. Molnar was looking for a graduate assistant to study aquaculture's sociological impacts on local communities in Honduras and thought Trejos might be a candidate for the position. While Molnar was still at Zamorano, he interviewed Trejos and decided she would be a great addition to the CRSP. She is now back in the US and currently enrolled at Auburn. She will return to Honduras this spring to perform her CRSP fieldwork.

Trejos's work will revolve around a Food Security Research investigation under the Tenth Work Plan. The title of the investigation is "Income, Food Security, and Poverty Reduction: Case Studies of Functioning Clusters of Successful Small-Scale Aquaculture Producers." The three objectives of this investigation are to identify clusters of small- and medium-scale producers who have engaged in repeated cycles of tilapia production; to review the circumstances and conditions that contribute to successful implementation and continued practice of tilapia culture; and to formulate principles and guidelines for providing technical assistance and research support for small- and medium-scale tilapia farmers in Honduras.



PD/A CRSP graduate student
Elizabeth Trejos-Castillo

Trejos believes her work can lead to the development of guidelines on how the adoption process works and clarify the dynamics of growing tilapia on small farms in Honduras. The intensive portion of Trejos's fieldwork will entail interviewing farmers, extensionists, and community leaders in Honduras. She will speak with individuals and groups for a month and will focus on regions where successful tilapia producers are active.

Trejos is optimistic about tilapia aquaculture in rural

Honduras. She notes the benefits of tilapia culture include a new source of income, diet improvement, and increased employment by private aquaculture companies. Trejos also projects that the potential for aquaculture growth in Honduras is strong since there is an adequate supply of water resources. Finally, she notes that women play a vital role in aquaculture ventures in Honduras because they are able to maintain the ponds and feed fish while their husbands are working in the fields.

Although the possibility for aquaculture growth exists, aquaculture development faces several constraints in Honduras. Trejos mentions the lack of technical support, no organized

marketing network for tilapia in Honduras, and limited motivation of rural people to adopt a new form of agriculture as obstacles to development. Trejos's project will dig further into these issues and illuminate the sources of these challenges so they can be addressed.

Trejos is busy outside of her CRSP work and graduate studies. Her greatest challenge is balancing graduate school, additional personal goals, and raising two boys. She finds relaxation in photography, art, music, movies, and reading. After completing her project with the PD/A CRSP and graduating from Auburn, Trejos would like to return to Costa Rica to work as a field or community extension agent. 🐟

WAS Annual Meeting a Success

The World Aquaculture Society annual meeting, Aquaculture America 2002, was held in San Diego, California, 27 to 30 January 2002. This year many CRSP researchers authored papers or posters on CRSP research:

- Craven, C., S. Sempier, and H.S. Egna. The Pond Dynamics/Aquaculture CRSP: developing technologies and networks for sustainable aquaculture and rural development. (poster)
- Liti, D.M., R. Mugo and M. Muchiri. Growth and economic performance of Nile tilapia (*Oreochromis*

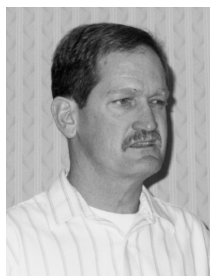
niloticus) fed on three brans in fertilized ponds.

- Gitonga, N. K., B.M. Fulanda and D.M. Liti. Aquaculture in Kenya, recent developments and constraints.
- Neira, I. and C. Engle. Markets for tilapia *Oreochromis* sp. in Nicaragua: A descriptive analysis of restaurants, supermarkets and stands in open-air markets.
- Valderrama, D. and C. Engle. Economic optimization of shrimp farming in Honduras.

Among other CRSP participants who attended the meeting and spoke on non-CRSP research were Amrit Bart, Claude Boyd, Konrad Dabrowski, Carole Engle, Kevin Fitzsimmons, Chris Langdon, Chhorn Lim, Rebecca Lochmann, Taworn Thunjai, Karen Veverica, and Yang Yi. 🐟

New Additions to the Technical Committee

We wish to extend a warm welcome to the newly elected Technical Committee members and express our appreciation to the continuing and past members for taking the time to serve as advisors to the program. The results of an email election were announced at the PD/A CRSP 2002 Annual Meeting, held 31 January 2002, in San Diego, California. The results of the election can be seen below. 🐟



Jim Diana,
re-elected Co-Chair



Claude Boyd,
Materials & Methods

PD/A CRSP Technical Committee

Name	Institutional Affiliation	Area of Representation
Co-Chairs		
Kevin Fitzsimmons	University of Arizona	
*Jim Diana	The University of Michigan	
Materials & Methods Subcommittee		
Freddy Arias	Escuela Agrícola Panamericana	Social & Economic Aspects
Yang Yi	Asian Institute of Technology	Environmental Effects
*Claude Boyd	Auburn University	Production Optimization
Technical Progress Subcommittee		
Amrit Bart	Asian Institute of Technology	Environmental Effects
Jim Bowman	Oregon State University	Production Optimization
*Joe Molnar	Auburn University	Social & Economic Aspects
Work Plan & Budget Subcommittee		
Carole Engle	University of Arkansas at Pine Bluff	Social & Economic Aspects
Wilfrido Contreras-Sánchez	Universidad Juárez Autónoma de Tabasco	Environmental Effects
*Chris Brown	Florida International University	Production Optimization
External At-Large Members		
Damon Seawright	US Tilapia Industry	
Ex-Officio Members		
Hillary Egna	Oregon State University	
Cormac Craven	Oregon State University	
Harry Rea	US Agency for International Development	

* newly elected members



Chris Brown,
Work Plan & Budget



Joe Molnar,
Technical Progress

Notice of Publication

This Notice of Publication announces recently published work carried out under PD/A CRSP sponsorship. To receive a full copy of a report, please contact the author(s) directly unless it is otherwise noted.

CRSP Research Report 02-184

A SUSTAINABLE SHRIMP AQUACULTURE SYSTEM FROM HONDURAS

H.L. Corrales, C.A. Lara, J.E. Heerin, and J.M. Wigglesworth
Grupo Granjas Marinas
Choluteca, Honduras

B.W. Green
Auburn University
Auburn, Alabama

Annual global capture fisheries destined for human consumption have leveled off at around 60 million metric tons in recent years. Additional supplies from aquaculture are important to provide for future demand for seafood. Shrimp aquaculture is a relatively new activity that has grown significantly since the 1980s. Compared with development of traditional agriculture practices, there is a great potential for improvement in shrimp cultivation techniques that must come from research and develop-

ment. Producers, producer organizations, and other development agencies must take a more active role in research activities. A program of field research was established during the last several years to determine and optimize production practices to achieve an environmentally sustainable system in Honduras. To assure sustainability of the activity, water quality trends will guide how much additional production area should be developed based on the elaboration of models to estimate the carrying capacity of individual estuaries. Honduras is a good example of producers, researchers, and government working together to define and optimize sustainable shrimp farming practices. There are substantial improvements to be made in decades to come. Continued support in the areas of water quality, health management, nutrition, and genetics is essential to assure the long-term viability of shrimp farming for producers and the environment.

This abstract was based on the original paper, which was published in *Sustainability of Agricultural Systems in Transition*, W.A. Payne, D.R. Keeney, and S.C. Rao (Editors). ASA Special Publication Number 64, Madison, Wisconsin, pp. 83-95.

Upcoming Conferences and Expositions

Date	Topic/Title	Event Location	Contact Information
April 23–27, 2002	World Aquaculture 2002	Beijing, China	Director of Conferences; Phone: 425-485-6682; Email: worldaqua@aol.com; Website: <www.was.org>
May 18–23, 2002	American Feed Industry Association (AFIA) Annual Convention	Reno, Nevada	John Ascuaga's Nugget; Email: afia@afia.org; Website: <www.aquafeed.com/dfmnr_events.html>
June 2–7, 2002	Feeding for Quality—10 th International Symposium on Nutrition and Feeding in Fish	Rhodes, Greece	Email: congress@amphitriton.gr; Website: <www.fishnutrition2002.gr>
June 7–10, 2002	AquaPartners 2002, Third International Exhibition and Conference on Fishing and Aquaculture	Athens, Greece	Alexiis Caniaris; EuroPartners Ltd, 101 Syngrou Avenue, 117 45 Athens, Greece; Phone: 30-1-922-1254; Fax: 30-1-922-1589; Email: europart@hol.gr; Website: <www.europartners.gr>
June 11–13, 2002	AquaVision 2002	Stavanger, Norway	Vidar Julien; Communications Manager, Nutreco Aquaculture Communications, PO Box 319, N-4002, Stavanger, Norway; Phone: 47-51-88-59-02; Fax: 47-51-58-43-68; Email: info@aquavision.nu; Website: <www.aquavision.nu/>
June 11–15, 2002	Atlantic Aquaculture Exposition and Fair	St. Andrews, Canada	Sydney Jane Peacock; PO Box 565, St. John, NB, E2L 3Z8, Canada; Phone: 506-658-0018 or 888-454-7469; Fax: 506-658-0750; Email: show@nbnet.nb.ca; Website: <masterpromotions.ca>
July 18–21, 2002	Fourth International Conference on Recirculating Aquaculture	Roanoke, Virginia	Terry Rakestraw; Phone: 540-231-6805; Fax: 540-231-9293; Email: aqua@vt.edu; Website: <www.conted.vt.edu/recirc/aqua.htm>
July 21–26, 2002	International Congress on the Biology of Fish	Vancouver, Canada	Don MacKinlay; Phone: 604-666-3520; Email: MacKinlayD@pac.dfo-mpo.gc.ca; Website: <www.fishbiologycongress.org>
July 28–31, 2002	Annual Meeting of the Society for the Study of Reproduction	Baltimore, Maryland	SSR Business Office, 1619 Monroe Street, Madison, WI 53711-2063; Phone: 608-256-2777; Fax: 608-256-4610; Email: ssr@ssr.org

Spanish-Language Native Species Reproduction Manual Available

A new manual is available that details the process of inducing reproduction in gamitana and paco in the Peruvian Amazon. This 12-page booklet is entirely in Spanish, and it explains the steps for fish culture from reproduction to harvest with the aid of several illustrations and diagrams. The manual was written by Fernando Alcántara Bocanegra from IIAP, Iquitos, Peru, and Marcos De Jesus, Chris Kohler, and William Camargo at SIUC, Carbondale, Illinois. For information on obtaining a copy of this booklet, contact:

William Camargo
Fisheries & IL Aquaculture Ctr.
SUI at Carbondale
Mailcode 6511
Carbondale, IL 62901-6511

Presenting the CRSPs on Capitol Hill

In Washington, DC, the PD/A CRSP recently joined the other eight CRSPs in presenting program goals, methods, and accomplishments to the interested public. Held on March 5, the fourth annual exhibition on Capitol Hill, which was sponsored by the National Association of State Universities and Land-Grant Colleges (NASULGC), allowed the CRSPs and other exhibitors to highlight the benefits gained from federal investments in food and agricultural research and education. The exhibition included more than 40 multimedia displays from federally supported research and education programs, including the CRSPs, with the intent to demonstrate these programs' range of accomplishments and objectives for agricultural development in the US and in recipient countries worldwide. The CRSP Council presented a display entitled "Stronger Agriculture Worldwide: Collaborative Research Support Programs."



Workshops and Short Courses

Date	Title/Topic/Site	Contacts
April 23–May 22, 2002	Crab Seed Production/Iloilo, Philippines	Pastor L. Torres Jr.; Head, Training and Information Division, SEAFDEC Aquaculture Department, Tigbauan, 5021 Iloilo, Philippines; Phone: 63-33-336-2937; Fax: 63-33-336-2891; Email: pltorres@aqd.seafdec.org.ph; Website: <aqd.seafdec.org.ph/4647.html>
May 6–9, 2002	Management of Aquaculture Effluents/Hawaii, USA	Gary L. Jensen; National Program Leader–Aquaculture, US Department of Agriculture, Cooperative State Research, Education and Extension Service, Stop 2220, 1400 Independence Ave., SW, Washington, DC 20250-2220; Phone: 202-401-6802; Fax: 202-401-6156; Email: gjensen@reeusda.gov
May 9–10, 2002	Live Feeds Culture/Ft. Pierce, Florida, USA	Aquaculture Center for Training, Education, and Demonstration (ACTED); Harbor Branch Oceanographic Institution, 5600 US Hwy 1 North, Ft. Pierce, FL 34946; Phone: 800-333-4264 or 561-465-2400; Fax: 561-466-6590; Website: <www.aquaculture-online.org>
May 13–24, 2002	Diseases of Warmwater Fish/Ruskin, Florida, USA	Tropical Aquaculture Laboratory and Whitney Laboratory; Phone: 352-392-5930; Fax: 352-392-9734
May 19–24, 2002	Aquatic Weed Control Short Course/Ft. Lauderdale, Florida, USA	Beth Miller Tipton; Phone: 352-392-5930; Fax: 352-392-9734
May 28–June 26, 2002	Marine Fish Hatchery/Iloilo, Philippines	SEAFDEC/AQD (see above)
June 12–13, 2002	Opportunities In Aquaculture/Ft. Pierce, Florida, USA	ACTED (see above)
June 14, 2002	Small System Culture and Operation/Ft. Pierce, Florida, USA	ACTED (see above)
June 17–21, 2002	Aquaponics Course–Combining Aquaculture and Hydroponics for Mutual Benefit/Bryson City, North Carolina, USA	Aquaculture International, Inc, PO Box 606, Andrews, NC 28901; Phone/Fax: 828-479-6294; Email: cwjohnson@graham.main.nc.us; Website: <www.brwm.org/aquacultureinternationalinc>
June 23–29, 2002	Aquaponics and Tilapia Aquaculture Short Course/University of the Virgin Isles Agriculture Experiment Station, St Croix, USVI	James E. Rakocy; University of the Virgin Islands, Agriculture Experiment Station, RR 2 Box 10,000, Kingshill, VI 00850; Phone: 340-692-4038; Fax: 340-692-4035; Website: <rps.uvi.edu/AES/Aquaculture/UVIShortCourse.html>
June 24–28, 2002	Recirculating Aquaculture Systems/Ft. Pierce, Florida, USA	ACTED (see above)
July 2–31, 2002	Management of Sustainable Aquafarming Systems/Iloilo, Philippines	SEAFDEC/AQD (see above)
July 22–26, 2002	Annual Aquaculture Water Reuse Systems Short Course/Shepherdstown, West Virginia, USA	Brenda Marchewka; Cornell University, Biological and Environmental Engineering, 302 Riley-Robb Hall, Ithaca, NY 14853; Phone: 607-255-2495; Fax: 607-255-4080; Email: bls19@cornell.edu
July 31–August 2, 2002	Pre-Meeting Symposium–The Impacts of Myxozoan Parasites in Wild and Farmed Finfish/Nanaimo, British Columbia, Canada	Simon Jones; Department of Fisheries and Oceans, Pacific Biological Station, Nanaimo, BC, Canada; Email: goatert@mala.bc.ca; Website: <www.pac.dfo-mpo.gc.ca/sci/aqua/english/symposium.htm>
August 6–October 4, 2002	Responsible Aquaculture Development/Iloilo, Philippines	SEAFDEC/AQD (see above)
August 25–30, 2002	Aquaculture Feed Preparation, Nutrition, and Feed Management/Texas A&M University, College Station, Texas, USA	Mian N. Riaz; Food Protein R&D Center; Email: mnriaz@tamu.edu; Website: <www.tamu.edu/extrusion>
November 25–December 13, 2002	Assessment and Reduction of the Environmental Impacts of Aquaculture/Wageningen, The Netherlands	International Agricultural Centre; Fax: 31-317-495395; Email: training@iac.agro.nl; Website: <www.iac.wageningen-ur.nl>

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