AQUANEWS

THE NEWSLETTER OF THE POND DYNAMICS/AQUACULTURE COLLABORATIVE RESEARCH SUPPORT PROGRAM

VOLUME 1 · NUMBER 1 OREGON STATE UNIVERSITY FALL 1983

OVERVIEWS

This is our first issue of AQUANEWS, the quarterly newsletter of the Pond Dynamics/Aquaculture CRSP. It marks the end of our first operational year, when basic preparations for research were completed -- and it signals the beginning of our first full cycle of field experiments at six host country locations. This first issue of AQUANEWS provides background information on the program and introduces regular features - such as "Mainstream", where we will profile a particular project. I trust that this forum will stimulate a lively exchange of ideas.

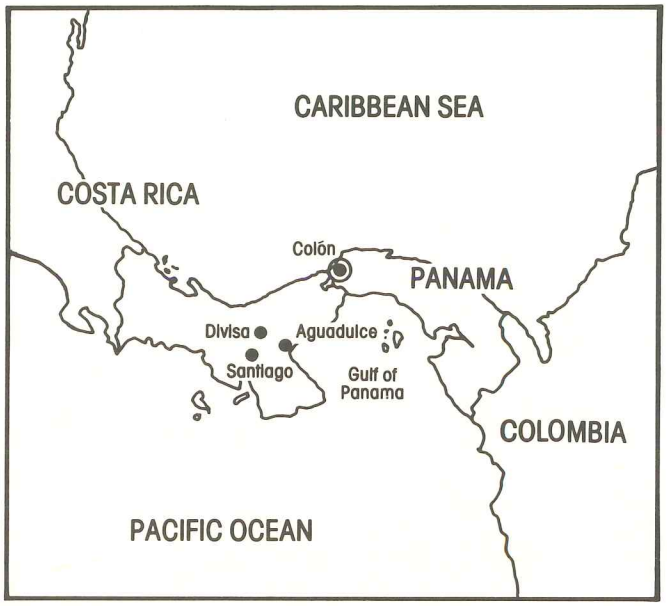
Jim Lannan
Program Manager

INTRODUCTION TO THE PROGRAM

The Title XII Collaborative Research Support Program (CRSP) in Pond Dynamics/Aquaculture is sanctioned by the U.S. Agency for Insternational Development (AID) and the Title XII Board for Food and Agricultural Development (BIFAD) under the authority of the International Development and Food Assistance Act of 1975 (P.L. 94-161). Through cooperative effort, selected universities in the U.S. and agricultural institutions in developing nations are working to develop fish cultural technology as a means of confronting food and nutritional problems.

Over the past few years, preparations have been made to organize parallel research efforts within a number of developing countries to determine the physical, chemical and biological mechanisms which regulate the productivity of various types of pond culture systems. Three U.S. institutional participants

(Continued on page 2)

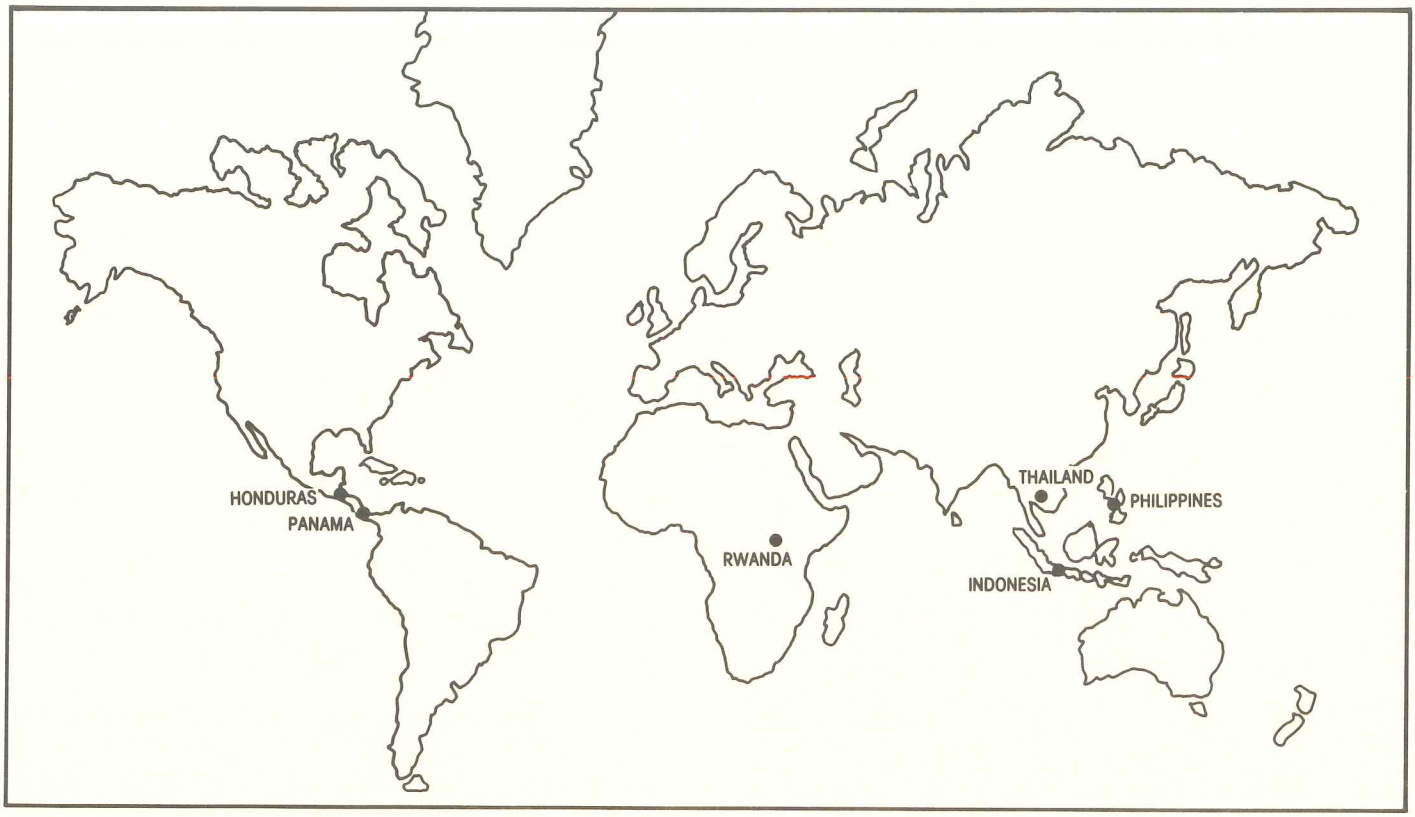


MAINSTREAM
THE PANAMA PROJECT

The CRSP project in Panama exemplifies the productivity of collaborative research efforts. Under the joint leadership of Auburn University and the National Directorate of Aquaculture of the Ministry of Agriculture (MIDA), Republic of Panama, researchers are completing preparations for a first round of experiments at a freshwater research station and already have initiated field studies at a brackish water research station. Both research facilities are located near Santiago, Panama.

The freshwater station is located on the grounds of Panama's National Agriculture Institute in Divisa. Initial development of the station occurred in 1974, with AID assistance. Facilities include a system of small ponds used in hatchery operations and a new complex of numerous

(Continued on page 3)



Location of current Pond Dynamics/Aquaculture CRSP Projects.

(INTRODUCTION Continued.)

were selected: Auburn University, the University of California at Davis and the Consortium for International Fisheries and Aquaculture Development (CIFAD).* Administrative agreements were formalized with six host countries: Honduras, Indonesia, Panama, Philippines, Rwanda and Thailand. Background studies and a detailed research plan have been prepared. Research teams of personnel from the U.S. and each host country have been assembled and scientists have been sent to each of the six host country research sites.

A research plan has been specially designed to uncover the fundamental physical, chemical and biological mechanisms that regulate the productivity of tropical fish ponds. Although the research stations are located in a range of environmental settings, efforts have been made to standardize as many variables as possible. One aim is to use the same culture organism, *Tilapia nilotica*, at all of the research sites. Standard procedures have been developed for pond preparation, fingerling production and stocking. Standardized experimental protocols will define the physical and statistical designs of planned experiments, data to be collected, sampling methods and schedules, and formats for data recording.

During the coming year, researchers will be gathering data that will define the baseline physical, chemical and biological conditions for each work location. Experiments will be conducted to quantify physical, chemical and biological responses to pond applications of various amounts of inorganic fertilizer, used to stimulate production. Information will be gathered on technical constraints limiting fry availability and researchers will assemble pertinent literature utilizing host country resources. A network of micro-computers will be used to facilitate data storage, handling and analysis. □

*CIFAD is composed of the University of Arkansas at Pine Bluff, the University of Hawaii, the University of Michigan, Michigan State University and Oregon State University.

PHYSICAL ENVIRONMENT
- Light
- Rainfall
- Wind speed/direction
- Air temperature
- Soil conditions
- Morphology
- Pond temperature fluctuation
- Pond depth fluctuation
- Hydrology

BIOLOGICAL LIMNOLOGY
- Secchi disk visibility
- Chlorphyll *a*

WATER CHEMISTRY
- Dissolved oxygen
- Temperature
- pH
- Alkalinity
- Total hardness
- Water quality indicators

FISH PRODUCTION
- Growth
- Reproduction
- Survival

A partial list of variables to be measured at each project location during the coming year.

(PANAMA Continued.)

500 m^2 ponds, of which 12 are dedicated to CRSP research. Other facilities include an enclosed hatchery building, outdoor concrete tanks and a laboratory-office complex.

The Divisa Station is the major source of fingerlings for an active aquaculture extension program being carried out by the government of Panama. Efforts have focused on the production of several species of tilapia and Chinese carp. Researchers have been successful in the induced spawning of bighead, grass and silver carp during the last several years. This year, they have spawned *Colossoma macroponum*, a promising aquaculture species from South America. It is anticipated that fingerling production at the Divisa Station and aquaculture research at a new station that is under development in Gualaca, Panama will continue to serve the needs of the growing extension and training programs administered by MIDA.

The "Ing. Ennique Ensenat" Marine Experiment Station, located in Aquadulce, was completed in 1980. The station is situated near the center of the commercial shrimp farming region in Panama. Facilities at the site include 42 500-m^2 ponds and a laboratory-office complex. Pond water supplies are pumped from a reservoir that is filled by a tidal stream.

The Aquadulce station, like most of the commercial shrimp farms within the region, was developed in an "albina" area. These are land areas that are flooded only during the higher tides of each lunar month. The salt that accumulates over time restricts the vegetation in the area to salt-tolerant scrub brush and grasses. A fringe of mangroves typically occurs between the albina and the ocean. The albina areas have proved suitable for shrimp culture, although the infrequency of flooding and the presence of the mangrove barrier necessitate the use of water supply systems.

In terms of economics, shrimp are the most important animals cultured in Panama. Operations are intensive, involving daily pumping of water and supplemental feeding. Yields are high, but so are production costs. Researchers at the Aqua Dulce Station are investigating several alternatives designed to increase the profitability of shrimp farming. One approach under consideration is the reduction of feed input, with the hope that the reduction of production costs would be proportionally greater than the reduction of yield. The application of organic fertilizers to stimulate the growth of food organisms is being studied as an alternative to feeding commercial rations during early months of production. Researchers also are investigating the benefits of shrimp-fish polyculture systems, where the fish may utilize natural feeds unavailable to the shrimp and by digestion reprocess them into a more usable form.

(Continued on page 4)

Pond-cultured shrimp.

(PANAMA Continued.)

Dr. Ronald Phelps, an Associate Professor with the Department of Fisheries, International Center for Aquaculture of Auburn University serves as the U.S. Principal Investigator for the Panama project. Dr. Richard Pretto, the National Director of Aquaculture in Panama, serves as the host country Principal Investigator. Dr. Pretto has been instrumental in developing the CRSP project in Panama and in establishing research priorities. The day to day research activities are the responsibility of the U.S. Research Associate Mr. David Hughes of Auburn University and his host country counterpart, Mr. Orlando Garcia. Mr. Garcia completed his B.S. degree in marine biology at Tadeo Lozano University in Colombia and has additional experience in shrimp culture in Ecuador. Mr. Hughes, who arrived in Panama in May 1983, is completing requirements for his Ph.D. degree at Auburn University. Mr. Hughes served as a Peace Corps volunteer in Panama and as a technical advisor for AID-sponsored aquaculture projects in El Salvador and Honduras. The CRSP staff is being assisted by other MIDA biologists and by students working on their thesis requirements.

The CRSP pond dynamics study was initiated in July at the Aquadulce brackish water station. This work focuses on the production of marine shrimp *(Penaeus)* and the development of shrimp-fish polyculture systems. The CRSP activities at the Divisa freshwater station have been directed toward the production of the tilapia fingerlings that will be used in field studies. Different approaches for producing fingerlings in hapas (net pens) placed in ponds are being examined. Two types of artificial diets will be tested on free swimming fry reared in concrete tanks and various types of incubation systems for eggs and sac fry will be investigated. The first pond dynamics study at the freshwater station and the second study at the brackish water station will be initiated this January, corresponding with the start of the local dry season. □

Hapa spawning of Tilapia.

INFORMATION EXCHANGE

An open invitation is issued to all program participants and the readership at large to submit questions or to offer their comments regarding the Pond Dynamics/Aquaculture CRSP. Two issues that have been raised by program participants during the past year are discussed below. Questions or comments to be addressed in future issues should be sent to the Editor of AQUANEWS.

* A number of program participants have noted what seemed to be "excessively long delays in obtaining approval for project-related international travel." Section 8 of the Standard Provisions of the Collaborative Research Support Grant for the program specifies that the AID Project Officer be advised 30 days in advance of an international trip. The entire approval process for such requests is as follows: a Principal Investigator submits a request for approval to the Program Manager; the Program Manager relays the request to the AID Project Officer by telephone and later by letter; the AID Project Officer communicates by cable with the appropriate AID Mission or U.S. Embassy; a return cable and the written

(Continued on page 5)

(EXCHANGE continued.)

approval of the AID Project Officer are mailed to the Program Manager; finally, the Program Manager notifies the originating Principal Investigator of approval, usually by telephone and then by letter.

The entire approval process is taking from 4 to 6 weeks. However, we advise Principal Investigators to submit their requests 6 to 8 weeks before departure to avoid inconvenience. It should be noted that most university business offices and government agencies that issue visas require documentation of approval before processing paperwork related to the trip.

We regret that we are not able to process approval requests more promptly. Once our network of micro-computers is installed we may have an opportunity to facilitate the process through use of electronic mail. Any positive suggestions are welcome.

* A similar problem brought to our attention by two Principal Investigators involves the procurement of restricted goods and service necessary for research efforts. Section 10 of the Standard Provisions of the Program Grant specifies that the written authorization of the AID Grant Officer be obtained before certain items, including chemicals and fertilizers, are purchased for a project. This authorization process is taking from 30 to 90 days. Program participants should be advised that longer delays should be expected in cases where commodities (e.g., vehicles) to be purchased outside the U.S. Obtaining administrative approval in such cases, which require a "source waiver", requires from 3 to more than 4 months.

We recognize that untimely delays in obtaining goods and services can compromise a research project and we will try to streamline the authorization process in the future. For example, we hope to obtain a "blanket authorization" for all goods and services necessary to carry out the provisions of the next annual work plan, to be issued in spring of 1984. Still, program participants are cautioned that the purchase of any items not listed in the next work plan would require a separate authorization. □

AID PROGRAM LINKED WITH CRSP

The Program in Science and Technology Cooperation (PSTC), a research support activity administered by AID, is intended to (1) stimulate and support new and innovative research approaches to development problems, (2) assist less-developed countries (LDCs) in building scientific and technical capabilities, and (3) involve LDC scientists and scientific institutions in research program activities and technology transfer. Areas targeted for funding include biotechnology and the marine sciences.

Dr. Silas Hung, a fish nutritionist at the University of California at Davis, in collaboration with Dr. Richard Pretto, the National Director of Aquaculture of Panama, recently submitted a PSTC grant application entitled "Determination of Fatty Acid Requirements and Optimum Dietary Lipid Levels for Tilapia (*Oreochromis niloticas*) Fingerlings (439)." A preproposal for the project was one of 90 semi-finalists selected from a field of 600. The final proposal was strengthened by linking the research with the Pond Dynamics/Aquaculture CRSP, as suggested by Dr. Irvin Asher, the Director of AID's Science Program.

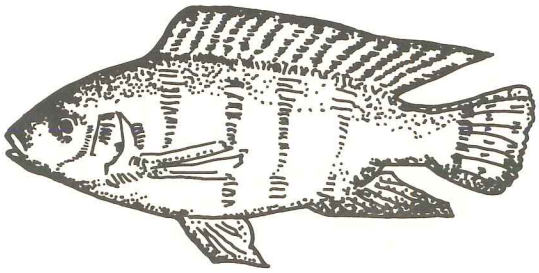
Pre-propoals for research grants can be submitted at any time, but are reviewed only once a year. Projects usually extend over a two to three year period. Total grants normally do not exceed $150,000. For further information, contact: Office of the Science Advisor, Agency for International Development, AID/SCI, Room 311, SAI-16, Washington D.C., 20523, (703) 235-3666. □

BULLETINS

- Principles and Practices of Pond Aquaculture: A State of the Art Review, a key background document for the Pond Dynamics/Aquaculture CRSP, will be released this fall. Edited by J.E. Lannan, R.O. Smitherman and G. Tchobanoglous, this volume contains articles on the history of U.S. International aquaculture development activities, biological mechanisms, pond culture practices, modeling, and the future of pond aquaculture.

- A meeting of CRSP Program Directors and AID Program Managers was held in Washington, D.C. on 14-16 February 1983. Discussions focused on administrative issues, including improving working relationships between the AID Missions and AID-sponsored program offices, financial matching requirements, triennial review and three year extension guidelines. The next program administration meeting will be held in Washington, D.C. on 24-25 October 1983.

- A seminar-workshop on the economics of tilapia production and marketing in the Philippines was held in August 1983. It was sponsored by the International Center for Living Aquatic Resources Management (ICLARM) and the Philippine Council for Agricultural and Resource Research and Development (PCARRD).



Tilapia nilotica

Program Manager ..... James E. Lannan
Assistant Program Manager and Newsletter Editor ..... Michele Leslie

Published quarterly by the Program Management Office, Pond Dynamics/Aquaculture Collaborative Research Support Program, Oregon State University Marine Science Center, Newport, Oregon 97365.

The Pond Dynamics/Aquaculture Collaborative Research Support Program is supported by the U.S. Agency for International Development under CRSP Grant No.: DAN-4023-G-SS-2074-00.

OSU is an equal opportunity university.

POSTMASTER: Send address changes to AQUANEWS, Oregon State University, Marine Science Center, Newport, Oregon 97365.

AQUANEWS
Oregon State University
Marine Science Center
Newport, OR 97365