AQUANEWS

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

VOLUME 5, NUMBER 1 OREGON STATE UNIVERSITY SPRING 1987

CRSP PLANS FOR THE FUTURE

The Pond Dynamics/Aquaculture CRSP soon will enter a new phase of research. The completion of the standardized field experiments in August 1987 marks the end of the current grant. Throughout the past year, CRSP participants discussed plans for continuation of the research program.

The CRSP Planning Subcommittee, an ad hoc group composed of one member from each of the three participatory institutions, the Consortium for International Fisheries and Aquaculture Development (CIFAD), the University of California at Davis, and Auburn University, met with USAID staff in Washington, D.C. on January 21 and 22, 1987.

The Planning Subcommittee responded in their CRSP continuation proposal to suggestions from USAID staff. They recommended continuation of operations in three USAID geographic areas: SE Asia, Latin America, and Africa. The erosion of funding over the past year made it necessary to discontinue four of the seven CRSP projects in order to maintain a high quality research programwithin budgetary constraints.

In a follow-up meeting held in Portland, Oregon on February 25 and 26, 1987, CRSP U.S. Principal Investigators and the Board of Directors refined the proposed continuation plan. They also agreed on the distribution of the budget. The plan calls for the continuation of projects in Thailand, Rwanda and Panama with the addition of U.S. (and possibly Host Country) universities involved in former CRSP projects in the Philippines, Indonesia, Honduras and the freshwater site in Panama.

The Continuation Plan centers on a conceptual model of pond culture systems developed by CRSP scientists. The model was used to identify research needs. New experiments will build on the results of previous CRSP research in a continuing effort to enhance the understanding of the dynamic processes regulating productivity of aquaculture ponds.

The fourth work plan will be implemented on September 1, 1987. The CRSP Technical Committee will develop subsequent work plans during the second year of work on each experiment. The later work plans will emphasize calibrating and verifying predictive models under field conditions, and field testing pond management practices.

The Thailand project will serve as the CRSP research location for investigations of freshwater aquaculture ponds typical of low elevations in the tropics. Project collaborators will be the National Inland

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Howard Horton (left) replaces Jim Lannan as CRSP Director.

NEW CRSP DIRECTOR APPOINTED; FORMER DIRECTOR STEPS DOWN

Dr. Jim Lannan has resigned as Executive Director of the CRSP after seven years of outstanding service. The CRSP owes much of its success to his pioneering efforts. The CRSP was conceived in 1982 under his guidance. His management style encouraged participation and collaboration of CRSP researchers. The technical goals of the CRSP reflect his desire to improve the efficiency of pond culture systems and to strengthen health and nutrition in less developed countries.

Jim Lannan will continue to be active in the CRSP as part of the Data Synthesis and Planning Team. Along with Dr. Raul Piedrahita, University of California at Davis, and Dr. William Chang, University of Michigan, he will synthesize data collected during the first three years of the global experiment. He will devote most of his effort to compiling a manual of operating strategies for pond culture systems. His continued involvement in technical aspects of the program will facilitate an orderly management transition.

As a Professor of Fisheries at Oregon State University (OSU), he plans to return to teaching fisheries courses and conducting research in fish conservation genetics. He also plans to devote more time to his duties as the Oregon representative to the Western Aquaculture Consortium.

Beginning May 1, Dr. Howard Horton assumed the responsiblities of Executive Director of the CRSP and as Director of International Fisheries at OSU. International Fisheries at OSU has grown to include the Consortium for International Fisheries and Aquaculture Development, the International Institute of Fisheries Economics and Trade, the Foreign Fishery Observer Program, and the CRSP. Dr. Horton will retain his position as Professor of Fisheries at OSU, which he has held for nearly thirty years.

Dr. Horton brings with him an impressive

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CRSP Plans for the Future (continued from p.1)

Fisheries Institute of Thailand, and three CIFAD institutions: the University of Michigan (lead institution), Michigan State University, and the University of Hawaii.

The Thailand project will investigate how fish stocking density, fertilizer quality, and pond depth affect fish yield. Specifically, researchers will study the trophic dynamics relating to pathways of inorganic nutrients.

The CRSP project in Aguadulce, Panama will continue to serve as the location of brackish water and saline aquaculture ponds for the CRSP. The project's goal is to quantify the dynamic processes that determine oxygen balance in aquaculture ponds. The cooperating institutions will be the National Directorate of Aquaculture (DINAAC) of Panama, Auburn University (lead institution), and CIFAD (represented by the University of Hawaii).

The principal research location for the Rwanda project will be the National University of Rwanda (UNR) Fish Culture Research Station near Butare. The Rwanda project is the only high elevation, freshwater site in the CRSP. CIFAD (represented by Oregon State University, and the University of Arkansas at Pine Bluff), Auburn University and UNR will collaborate on pond dynamics experiments. OSU will serve as lead institution. The Rwanda project will investigate relationships between chemical input characteristics and the response of pond systems. A unique feature of the Rwanda project is the use of composted materials as nutrient sources for aquaculture ponds.

The technical objectives of these projects overlap, preserving the global perspective of the CRSP. However, while the conceptual model is the same for all projects, the rates and nature of the processes differ in important ways between the systems.

The Data Synthesis Team will analyze data generated from the global experiment in an effort to quantitatively describe these processes. Data synthesis and analysis will constitute the primary U.S.-based research component of the CRSP.

The goals of the Data Synthesis Team are to develop, calibrate, and verify models of pond dynamics. The Team also plans to compile a manual of pond operating strategies for optimizing yields, increasing the reliability, and improving the efficiency of pond culture systems.

New Director Appointed (continued from p.1)

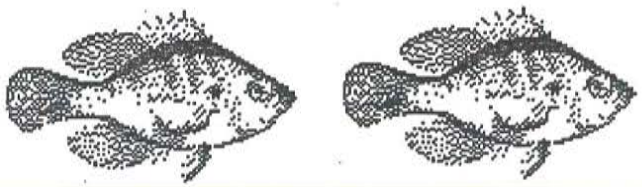
record of accomplishments in fisheries. He has published over 40 articles dealing with marine, estuarine and freshwater fisheries. He has been the contracting officer for the Foreign Fishery Observer Program since 1978, and was the leader of the Extension Sea Grant Program, a post he assumed in 1980.

In his new role as Director of the CRSP, he plans to consolidate and refine the program. Emphasis will be placed on "solidifying our gains" through new publications. The CRSP extends a warm welcome to him. Dr. Horton may be reached at: CRSP, Office of International Research and Development, Snell Hall, OSU, Corvallis, Oregon 97331. Telephone: 503-754-2228.

Research Brief: Fertilization Effects On Pond Carrying Capacity

C. Kwei Lin, Thailand--

Carrying capacity in extensive fish culture ponds is influenced by the quantity and quality of feed and water. Water quality is effected by the nature and quantity of fertilizers applied. In the CRSP project in Thailand, a series of fertilization experiments in earthen ponds was conducted to determine the carrying capacity for optimal Tilapia production. The experiments involved applications of inorganic phosphate, phosphate and urea, and organic fertilizer. Each experiment was run in 3 or 4 replicates for five months. Fish yield, production of food organisms (plankton and benthos), and water quality in response to fertilizer application were determined. Results showed that pond carrying capacity ranged from very low to very high. Given equal phosphorus and nitrogen input, ponds had greater carrying capacity using organic than inorganic fertilizer. An optimal carrying capacity was established in ponds receiving chicken manure at an average rate of 71 kilograms/hectare/day. These ponds produced organic carbon at an average rate of 100 kg/ha/day and fish at 24 kg/ha/day. The indirect food conversion ratio of chicken manure was 3:1 and the net organic carbon conversion ratio was about 5:1.



Research Brief: Nitrogen Fixation as a Source of Nitrogen Input in Fish Ponds.

C. Kwei Lin, Thailand--

A study conducted by the CRSP project in Thailand showed that nitrogen fixation is a significant means of nitrogen input in tropical fish ponds. The input of nitrogen derived from natural biological fixation in extensive Tilapia (*Oreochromis nilotica*) ponds was determined biweekly for pond water and sediments for over five months. The rate of nitrogen fixation ranged from non-detectable to 105 mg N/m^3/day in the water column, and from 0 to 37 mg N/kg/day in wet sediments. In comparison, the nitrogen input from fertilization with chicken manure at a rate of 71 kg/ha/day was 200 mg N/m^3/day. The fixation rate was inversely related to the concentration of ammonia present in the pond water. Most of the fixation occurred during the daylight hours, indicating fixation involved photosynthetic blue green algae. Blue green algae commonly found in the pond water were *Anabena, Cylindrospermum, Oscillatoria, Nodularia,* and *Anacystis.* Among them, *Anabena, Cylindrospermum* and *Nodularia* possess heterocysts, which are proven sites for nitrogen fixation.

CRSP NEWS

Panama. David Hughes, U.S. Research Associate from Auburn University, and Richard Pretto Malca, CRSP Principal Investigator from Panama, presented a poster, "Wet and dry season comparisons in *Pennaeus vannamei* grow-out in Panama receiving various flushing rates: Water quality fluctuations," at the 18th Annual Meeting of the World Aquaculture Society in Guayaquil, Ecuador in January 1987. David Teichert-Coddington, U.S. Research Associate for the CRSP freshwater project in Gualaca, Panama, has joined David Hughes at the CRSP brackish water project in Aguadulce.

Rwanda. All of the global experiments have been completed at the CRSP project in Rwanda. M. Van Speybroeck gave a 30-hour fish culture course to third-year agronomy students at the National University of Rwanda (UNR). Boyd Hanson, U.S. Research Associate from Oregon State University, is cooperating with John Moehl of the National Fish Culture Project, and UNR and USAID officials to produce a reorganization plan for fish culture research and development in Rwanda. Felicien Rwangano and Eugene Rurangwa presented CRSP research results at a fish culture conference in Bujumbura, Burundi in late February. Donovan Moss of Auburn University, chairman of the CRSP Board of Directors, visited the Rwasave station in March. The Rwasave station recently was designated the Regional Research Center.

Thailand. CRSP staff offered a 2-week course at the National Inland Fisheries Institute on the application of microcomputers in fish culture research.

Honduras. Bart Green, U.S. Research Associate from Auburn University, presented two papers at the 1987 World Aquaculture Society Meeting in Guayaquil, Ecuador. Hermes Alvarenga, Research Associate from Panama, presented the only paper on fish culture at the 2nd National Conference on Animal Husbandry Research at La Ceiba, Honduras. He also presented a paper on research done at the CRSP project site at the 33rd Annual Meeting in Guatemala of the Collaborative Central American Program for the Improvement of Food Production.

Indonesia. Chris Knud-Hansen, U.S. Research Associate from Michigan State University, represented the Pond Dynamics/Aquaculture CRSP at a meeting at the USAID Mission in Jakarta. Both the Pond Dynamics/Aquaculture CRSP and the Small Ruminants CRSP made presentations to Duane Acker, Agency Director for Food and Agriculture, USAID, Washington, D.C.

CRSP RESEARCHERS PRESENT PAPERS AT CONFERENCES IN THAILAND

CRSP researchers presented papers at the Second International Symposium on Tilapia in Aquaculture (ISTA II) held in Bangkok, Thailand on 16-19 March 1987. Over 250 participants came from 40 countries. Results of CRSP research based in Thailand and Rwanda were presented in the following three papers and one poster:

- C. Kwei Lin, V. Tansakul, and C. Apinahpat. Biological nitrogen fixation as a source of nitrogen input in fishponds.
- C. Kwei Lin and J.S. Diana. Fertilization effects on pond carrying capacity in extensive culture of tilapia.
- J.S. Diana, P.J. Schneeberger, and C. Kwei Lin. Relationship between primary production and yield of tilapia in fishponds.
- B.J. Hanson, J.F. Moehl, Jr., K.L. Veverica, F. Rwangano, and M. van Speyboeck. Pond culture of tilapia in a high altitude, equatorial African country.

The annual Thailand Fisheries Conference, sponsored by Kasetsart University and the Royal Thai Department of Fisheries, was held at the National Inland Fisheries Institute, Bangkhen, Bangkok on 2-4 February 1987. Thai biologists of the CRSP team in Thailand contributed three papers:

- Comparison of zooplankton production between inorganic and organic fertilizer ponds;
- Rearing post-larvae of *Macrobrachium rosenbergii* at high stocking density in circular tanks;
- Toxicity and residual effects of formalin treatment on larvae of *Macrobrachium rosenbergii*.

CRSP MILESTONES

Robert Fridley has been appointed to serve on the CRSP Board of Directors. Dr. Fridley worked for many years with Weyerhauser and was the head of the Agricultural Engineering Department at the University of California at Davis in the early 1970's. He is now Director of the Aquaculture and Fisheries Program at the University of California at Davis. He replaces **Wallace Clark, Jr.** The CRSP thanks Dr. Clark for his many years of service and guidance to the program.

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Hilary Berkman has recently replaced **Jim Bowman** as the graduate research assistant in charge of maintaining the Central Data Base for the CRSP. Ms. Berkman will work at the CRSP Program Management Office in Corvallis, Oregon while pursuing her doctorate in fisheries at Oregon State University.

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Lawrence Curtis, Principal Investigator of a CRSP Special Research Topic project at Oregon State University, has been awarded the Savory Outstanding Young Faculty Award by the College of Agricultural Sciences at Oregon State University. Dr. Curtis has conducted research on the metabolism of methyl-testosterone in sexually undifferentiated tilapia.

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Kitjar Jaiyen replaces **Thiraphan Bhukaswan** as Host Country Principal Investigator for the CRSP project in Thailand. Dr. Bhukaswan has been promoted to Senior

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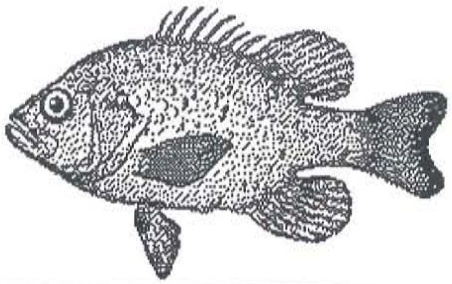
CRSP Milestones (continued from p. 3)

Fishery Advisor to the Minister of Fisheries. Dr. Jaiyen received his Bachelor's degree from Kasetsart University, Thailand and his graduate degrees (M.S. and Ph.D.) in fisheries from the University of Michigan. He is also the Director of the National Inland Fisheries Institute of Thailand.



MEETINGS and TRAINING PROGRAMS

22 June-10 July and 13-31 July 1987. Fisheries Data Management Using Microcomputers, a training program for fisheries and aquaculture managers and researchers. Offered by the Consortium for International Fisheries and Aquaculture Development (CIFAD) and Oregon State University (OSU) at OSU. Session I: Introduction to computers and the design of fisheries data bases. Session II: Analysis of fisheries data. Write to: CIFAD Training Programs, Office of International Agriculture, Oregon State University, Corvallis, Oregon 97331, USA.

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2-7 August 1987. International Conference on Biomanipulation of Natural and Artificial Freshwater Ecosystems, Lake Kinneret, Tiberias, Israel. Write to: The Organizing Committee, International Conference on Biomanipulation of Natural and Artificial Freshwater Ecosystems, P.O. Box 3190, Tel Aviv 61031, Israel.

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11-14 August 1987. Third International Conference on Warmwater Aquaculture, at Brigham Young University-Hawaii. Direct Inquiries to: Aquaculture Conference, BYU-Hawaii Continuing Education, Box 1963 BYU-HC, Laie, Hawaii 96762, USA.

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17 August-18 September 1987. Fisheries Economics, a training program for administrators and faculty involved with curricula development. The week of 17-21 August will be devoted to economics of aquaculture and can be taken separately. Offered by the Consortium for International Fisheries and Aquaculture Development (CIFAD), the International Institute of Fisheries Economics and Trade (IIFET) and Oregon State University at OSU, Corvallis, Oregon. Direct inquiries to CIFAD Training Programs, see address to left.

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September 1987. The 5th International Artemia Training Course will be offered by the State University of Ghent, Belgium. For more information, contact: Patrick Sorgeloos, Artemia Reference Center, State University of Ghent, Rozier 44, B-9000, Ghent, Belgium.

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5-9 January 1988. The 19th Annual Meeting of the World Aquaculture Society will be held in Honolulu, Hawaii. The theme for the meeting is "East Meets West: Nutrition, Product Quality, and Marketing." Two special sessions are planned: marketing strategies in aquaculture and aquaculture in developing countries. For information, write to: Nancy Hadley and John Manzi, Marine Resources Research Institute, P.O. Box 12559, Charleston, South Carolina, 29412, USA.

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Director.....Howard F. Horton

Published quarterly by the Program Management Office, Pond Dynamics/Aquaculture Collaborative Research Support Program, Office of International Agriculture, Snell Hall, Oregon State University, Corvallis, Oregon, 97331.

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.

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