

Expert consultation on ecological risk assessment of genetically improved fish

Studies undertaken in recent years on the genetic improvement of commercially important cultured fish species by selective breeding and other non-transgenic mechanisms have started to yield results and improved strains are now being disseminated by most member countries of the International Network on Genetics in Aquaculture (INGA). For example, improved carp and tilapia breeds now exist in Bangladesh, China, Fiji, India, Indonesia, Malaysia, the Philippines, Thailand, and Vietnam, and are being disseminated to farmers.

Improved strains are expected to bring significant economic and social benefits to poor people in developing countries. However, if not properly managed, these could also lead to risks to aquatic ecosystems and biodiversity once they escape into the natural environment. Hence, before the introduction and dissemination of improved strains are undertaken, it is imperative that relevant policies and protocols are reviewed, methods to assess the possible ecological risks formulated, and ways and means of averting any possible impacts identified, including measures to contain escapes.

With funding support from the Norwegian Agency of Development Cooperation (NORAD), the INGA/WorldFish Center, in collaboration with the Bangladesh Fisheries Research Institute, organized an *Expert Consultation on Ecological Risk Assessment of Genetically Improved Fish* during 4-8 August 2003 in Dhaka, Bangladesh. Fifty-four participants attended the meeting. These included

aquaculturists, geneticists, ecologists, biodiversity specialists, researchers, administrators and development workers from 20 countries representing national institutions in Asia, Africa, Europe, North America, and the Pacific, advanced scientific institutions and regional/international organizations (i.e., Food and Agriculture Organization of the United Nations - FAO, World Conservation Union - IUCN, Southeast Asian Fisheries Development Center - SEAFDEC, Secretariat for the Pacific Community - SPC, Network of Aquaculture Centres in Asia-Pacific - NACA, Asian Institute of Technology - AIT, and the WorldFish Center). The participants discussed the genetic and ecological risks of introducing improved breeds, as well as the methods and capacity of member countries in risk assessment. They also reviewed risk management and mitigation measures, the existing policy instruments, and gaps in their implementation. Then they formulated recommendations and drew up mechanisms to address the gaps in risk assessment and management, and the policy environment. The following is a summary of recommendations from the expert consultation:

- **Policies.** Relevant national and international instruments and non-binding Codes of Conduct related to introductions be reviewed and strengthened, taking into account national obligations under international instruments and agreements.
- Effective institutional frameworks, monitoring and enforcement mechanisms related to introductions



Ukil Abdus Sattar Bhuiyan, State Minister, Bangladesh Ministry of Fisheries, inaugurating the Expert Consultation on Ecological Risk Assessment of Genetically Improved Fish

of improved strains be established at national and local levels as appropriate.

- **Implementation.** Transparent, objective and practical methodologies be adopted and promoted for the assessment of risks associated with the dissemination of improved strains.
- **Capacity building.** Institutional capacity be strengthened at all levels to implement and enforce policies and regulations pertaining to the introduction and dissemination of improved strains of fish.
- International cooperative programs be undertaken to improve understanding and address ecological, social and economic issues related to improved strains.
- **Awareness.** The public and decision-makers be made aware of the benefits and potential risks of improved strains.
- Networking be promoted among all relevant institutions to address knowledge gaps and inform all stakeholders of issues related to research, use and management of improved strains.
- **Transboundary movements.** Countries initiate measures to fill policy gaps, and strengthen bilateral frameworks, where necessary, to cover transboundary movements, as provided for in the FAO Code of Conduct on Responsible Fisheries and pursuant Technical Guidelines on Aquaculture.

The main recommendations of the meeting will be published as a separate document, "Dhaka Declaration on Ecological Risk Assessment of Genetically Improved Fish."



Participants of the expert consultation on ecological risk assessment of genetically improved fish

Advanced course on quantitative genetics for INGA member country scientists

The WorldFish Center/INGA, with financial support from the Norwegian Agency for Development Cooperation (NORAD), is organizing a two-week training course on *Quantitative Genetics and its Application to Aquaculture* during 20-31 October 2003 in Penang, Malaysia. The objective is to strengthen the capacity of developing country scientists in the field of quantitative genetics, especially in the analysis and interpretation of genetic data. The course will bring together scientists from INGA member countries involved in the planning, design and implementation of genetic improvement programs for aquaculture species, expose them to high caliber lectures on the subject and teach them how to find solutions to problems in fish breeding and data analysis. The training program

will comprise lectures and practical exercises with an emphasis on hands-on analysis of actual breeding/genetic datasets. The course curriculum will cover the following topics: (i) general overview of the design and implementation of genetic improvement programs; (ii) strain choices and comparisons; (iii) estimation of phenotypic and genetic parameters (heritability, phenotypic and genetic correlations); (iv) breeding objectives and selection indices; (v) estimation of breeding values; (vi) incorporating DNA fingerprinting into selection schemes; (vii) mate allocation strategies in genetic improvement programs; (viii) importance of population size in selection programs; (ix) estimating genetic change; and (x) potential of biomolecular techniques in fish breeding.

INGA expands membership

The GIFT Foundation International Inc., Philippines, Asian Institute of Technology (AIT), Thailand, and University of Western Australia, Australia, have recently been admitted as Associate Members of INGA. With their expertise in the practical aspects of fish breeding and genetics research, they will make a valuable contribution to achieving the objectives of the network. To date, INGA has 13 developing countries as Members and 12 advanced scientific institutions, 1 private sector institution, and 3 regional and international organizations as Associate Members.

Workshop on public-private partnerships for the delivery of Tilapia genetic research outputs to Philippines farmers

Through the financial support of the International Development Research Centre (IDRC) of Canada, the WorldFish Center and Philippines institutions comprising the partners of the Tilapia Science Center (i.e., Freshwater Aquaculture Center, College of Fisheries and Phil-Fishgen of the Central Luzon State University; the National Freshwater Fisheries Technology Center, Bureau of Fisheries and Aquatic Resources of the Department of Agriculture; and the GIFT Foundation International, Inc.) are conducting research to evaluate the evolving public-private partnerships and determine their effects on the sustainability and achievement of development objectives in fish genetics research.

A workshop held in Angeles City, Philippines, during 25-27 June 2003, reviewed public-private partnerships in disseminating tilapia genetics research outputs to end-users and formulated recommendations that have policy implications. Thirty-seven participants representing various stakeholder groups (i.e., national aquatic research system-NARS, international organizations, advanced scientific institutions, the



Participants of the workshop on public-private partnerships for the delivery of tilapia genetic research outputs to end-users

private sector, hatchery operators, and farmers) participated in the workshop. The participants discussed and evaluated the effectiveness and efficiency of various systems for the distribution and dissemination of improved tilapia breeds; and analyzed issues, problems and constraints for the delivery and uptake of genetics-based technologies

and their outputs that need to be addressed. Based on the deliberations, the participants came up with recommendations that will be published as a formal document titled "Angeles Declaration: Public-Private Partnerships for Dissemination of Tilapia Genetic Research Outputs to End-Users."

Development of strategy for dissemination of improved Rohu in India

The Expert Consultation on the dissemination of improved strains of fish organized by INGA in Bangkok, Thailand, in June 2002 recognized the need for national plans and strategies for the effective dissemination of improved strains of fish to target beneficiaries without losing the genetic gains. The Central Institute of Freshwater Aquaculture (CIFA), India, in collaboration with the Institute of Aquaculture Research (AKVAFORSK), Norway, has undertaken research for the genetic improvement of Rohu (*Labeo rohita*), resulting in improvement in average growth of 17 per cent per generation after three generations of selective breeding and initiated dissemination through selected hatcheries. As part of the INGA's

strategy to assist member countries in effective dissemination of improved fish strains of fish, a mission comprising of INGA Research Coordinator Dr Modadugu Gupta and Dr Raul Ponzoni of the WorldFish Center, Mr Basilio Rodriguez, Jr. of the GIFT Foundation International and Dr P.V.G.K. Reddy, a well known geneticist and retired Principal Scientist of CIFA, was fielded in July 2003 to assist CIFA in developing a plan for disseminating the improved strain throughout the country. The mission held discussions with the Director and scientists of CIFA and extension officers, visited hatcheries in Andhra Pradesh, and reported to CIFA their suggestions and plans for the sustainable dissemination of the improved rohu strain.

INGA holds Steering Committee Meeting in Bangladesh

The Seventh Steering Committee Meeting of INGA was held on 6 August 2003 in Dhaka, Bangladesh, in conjunction with the Expert Consultation on Ecological Risk Assessment of Genetically Improved Fish. Members of the Steering Committee, senior scientists from 13 participating countries, representatives from advanced scientific institutions, and representatives from regional and international organizations attended. The participants, besides discussing the progress and follow-up actions since the 6th Steering Committee Meeting in Hanoi in 2001, also identified new initiatives that will be undertaken by the network over the next three to five years. Many member countries requested the WorldFish Center to initiate a regional project for genetic improvement of freshwater prawns (*Macrobrachium rosenbergii*) in view of the high demand in domestic and export markets.

NTAFP news

NTAFP member and ex-staff member of WorldFish Center's program in Bangladesh wins John Holliday student conservation award

Mr Debashish Mazumdar, a doctoral student at the Australian Catholic University, New South Wales, Australia, has won the 2002 New South Wales Fisheries' John Holliday Student Conservation Award for his research on the impact of saltmarshes on fisheries in Southeast Australia. The award program, in memory of the late Dr John Holliday who dedicated 26 years to working for New South Wales Fisheries, aims to encourage post-graduate students to share their research findings on topics of

interest to the department.

Mr Mazumdar's research shows that saltmarshes may be very important as a temporary habitat and as a food source, despite being infrequently inundated with salt water. His data indicate that the number of fish and fish species in saltmarshes are only slightly lower than in mangrove areas. The crabs that live in saltmarshes produce a very large number of offspring, especially in winter, and these are exported out of the saltmarsh areas

at high tide. Many fish species, including commercially important flat-tailed mullets, feed predominantly on crab larvae.

Mr Mazumdar's report was judged as being based on sound science and containing information relevant to managing and protecting saltmarsh areas in Australia.

Source: NSW Fisheries website (www.fisheries.nsw.gov.au Newsroom – 15 July 2003).

Indian scientist receives award in marine fisheries

The Indian Council of Agricultural Research (ICAR) conferred the prestigious Rafi Ahmed Kidwai Memorial Award for the biennium 2001-2002 in the area of marine fisheries to Dr V. Sriramachandra Murty, formerly the Head, Division of Demersal Fisheries, Central Marine Fisheries Research Institute, Cochin, India. ICAR instituted this award in 1956 to perpetuate the memory of Shri Rafi Ahmed Kidwai who was the President of the ICAR

from 1952 to 1954 and "to create an incentive for research workers in India and to recognize outstanding research work done in the fields of agriculture, animal husbandry and allied sciences." Dr Murty was recognized for nearly four-decades of pioneering research in fisheries biology, population dynamics and stock assessment of several groups of marine fish. The work has contributed significantly to marine fisheries development and management of

exploited demersal finfish stocks in India, besides providing valuable references for scientists involved in marine fisheries research. Dr Murty was also cited for his pioneering research on the assessment of marine ornamental fish resources of Lakshadweep. His contributions are of immense value in resource management and will help policy planners to devise and implement sustainable fisheries management policies relevant to the Indian situation.

Kyoto World Water Forum - a fisheries perspective

An estimated 24 000 participants gathered in Kyoto, Shiga and Osaka for the third World Water Forum (WWF) during 16-23 March 2003. Building on the achievements of the first Forum held in Morocco in 1997 and WWF 2 in The Hague in 2000, the Kyoto Forum provided an opportunity for the world's water community to debate and exchange information on recent developments and emerging issues concerning the management of the world's freshwater. While the WWF launched the World Water Vision in 2000, Kyoto provided an opportunity to assess the progress towards turning the vision into reality.

The Forum consisted of over 351 working sessions covering 33 themes and issues, such as: water and poverty, governance, climate, cities; water, food and the environment; and water, nature and the environment. It brought together water users, managers, researchers, NGOs, Ministers, CEOs, and youth from across the globe. The Forum allowed discussion on a remarkably rich diversity of current issues and initiatives at multiple levels in different parts of the world. Following the Forum, a Ministerial meeting resulted in a Ministerial Declaration that is available at www.world.water-forum3.com, together with the Forum's final Statement. The Declaration and Statement highlight the importance of governance, capacity-building, finance, water resources management and benefit sharing, drinking water and sanitation, water for food and rural development, water pollution prevention and ecosystem conservation, and disaster mitigation and risk management. They emphasize the importance being given to these issues in the current debates on water at the national and international levels.

In providing a forum, Kyoto was clearly a success. But as with most major conferences, many people will ask - what difference has Kyoto made to the lives of the poor people dependent upon freshwater? Kyoto certainly provided an important opportunity for discussion on concerns and for exchanging information - but will this help improve water management? By itself the Forum will not bring about change. The more important question is whether the international community will build upon Kyoto to develop new approaches to addressing the challenges and conflicts identified there. For those of us concerned with fisheries and aquaculture this raises the question of how we can build upon Kyoto to foster action to address our concerns.

At first glance, the discussions at Kyoto were not encouraging for fisheries. Fish, fisheries

and aquaculture were all largely absent from the technical debates. In sessions on water and food, and the environment and water, no papers on fish were presented and the fisheries community was very much in the minority in the discussions. However, in retrospect this is not surprising. How often do we discuss aquaculture development or fishery management in terms of water management, or how fisheries and aquaculture can improve water productivity? And when we do so - how effectively do we engage with the water management and research community? One of the messages from Kyoto is that the fisheries managers and researchers need to engage much more effectively with our colleagues concerned with water management in order to understand their perspectives and concerns, and learn how fisheries and aquaculture can relate to these.

In contrast, the Ministerial Declaration gives a high profile to fish in declaring that "Inland fisheries being a major source of food, freshwater fish production should be addressed through intensified efforts to improve water quality and quantity in rivers and protection or restoration of breeding areas." Interestingly, this was achieved as a result of the recommendations from the Second International Symposium on the Management of Large Rivers for Fisheries (held in Phnom Penh in February 2003) and the efforts of the Mekong River Commission (MRC) to promote wider awareness of these recommendations at Kyoto. Greater investment of this kind will do much to raise the profile of fisheries issues in these policy debates.

The central message from Kyoto is that the policy debate and technical discussions that are taking place around water are of central importance to fish and fisheries and, hence, there is an urgent need for much greater investment by the fisheries and aquaculture community to engage in these processes. As the international community seeks to identify ways by which to improve water productivity through more integrated approaches to water use, it will become increasingly important to understand and promote how best to integrate fisheries and aquaculture. Amongst the research areas where special attention is merited, four stand out:

Integrating fish into farm and water management. A wide range of opportunities exists for improving water productivity by integrating fish production into farming and water management systems. Practical technologies for doing so need to be developed through participatory research

and development approaches.

Ecosystems services. As the water community moves from defining water productivity in terms of more crop per drop to embracing a wider understanding of the role of water in supporting livelihoods at the basin level, more attention needs to be given to assessing ecosystem services and resource values that are sustained by water.

Environmental flows. If these values are to be sustained in the face of increasing competition for water, there is an urgent need to develop user-friendly methodologies for environmental flow assessment and build capacity to use these.

Governance. Work on all of these issues needs to be underpinned by a fundamental assessment of how aquatic resources and farming systems are governed and how the benefits are shared amongst stakeholders. In the absence of governance systems that foster improved engagement of fishers and farmers in water resource management decisions and improve benefit sharing, new technologies will be of little value.

The WorldFish Center is currently engaged in several initiatives that will help foster this work:

Fish for All has recognized water as a major priority and is building awareness of the importance of fish, fisheries and aquaculture in water management.

The Comprehensive Assessment of Water in Agriculture is supporting a number of projects to assess the current understanding of the contribution of fish and fisheries to agricultural productivity and highlighting future research needs.

The Challenge Program on Water and Food has given high priority to Aquatic Ecosystems and Fisheries as one of five central themes of the program. WorldFish will coordinate activities under this theme on behalf of the Challenge Program.

By pursuing these initiatives over the course of the next few years and working to develop a closer partnership with the water management and research communities, WorldFish hopes to see a much higher profile for fish at the next WWF in 2006 and greater tangible benefits to fishers and farmers from improved water management.

P. Dugan is from the WorldFish Center's Regional Research Center for Africa and West Asia, PO Box 1261, Maadi, Cairo, Egypt. E-mail: worldfish-egypt@cgiar.org

Dr. Aprilani Soegiarto awarded prestigious silver medal

The WorldFish Center is pleased to announce that **Prof Dr Aprilani Soegiarto**, a former Board Member of the WorldFish Center (1997-2003), was awarded a Silver Medal from the Wageningen University and Research Center, Wageningen, the Netherlands. The award was bestowed on him as the Chair of the Board of Trustees of the PROSEA (Plant Resources of Southeast Asia) Foundation during 1989-2003. More than 1 200 experts from all over the world are involved in PROSEA. Dr Aprilani helped to complete the 24-volume PROSEA Handbook in a successful joint venture between Wageningen University and six scientific institutions in Southeast Asia. The realization of the basic mission of PROSEA, i.e., the publication of a 24-volume Handbook on 7 000 species of useful plants of Southeast Asia over a

time-span of 16 years, is a formidable achievement. Congratulations on the hard work and rewarding experience.

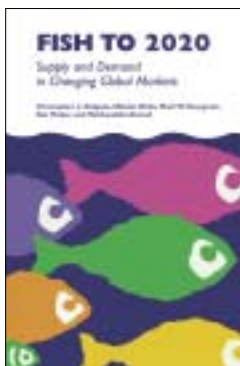
Dr Aprilani Soegiarto earned his Ph.D. in Marine Science from the University of Hawaii. He is an internationally recognized marine biologist, and has served as the fourth Vice Chair of the International Governmental Oceanographic Commission of UNESCO (1987-1990) and chair of the Association of the Southeast Asian Nations (ASEAN) Subcommittee on Marine Sciences (1984-1992). Later in his career he became involved in research management at the Indonesian Institute of Sciences (LIPI) in Jakarta, Indonesia.

He holds three concurrent positions: Research Professor at the Center for Research and Development in

Oceanology; Professor in Oceanology at the Bogor Agriculture University; and Chairman, Group II Natural Resources and Energy of the Indonesian National Research Council.



New publication



Fish to 2020 - Supply and Demand in Changing Global Markets

by Christopher L. Delgado, Nikolas Wada, Mark W. Rosegrant, Siet Meijer, and Mahfuzuddin Ahmed

Growing crises and controversy are plaguing the fish industry worldwide. With more people consuming more fish than ever before, the world's oceans are being overfished and fish farming is threatening surrounding waters and even wild fish stocks. Given this troubling picture, can an environmentally sustainable fish industry that also serves poor people be developed over the next two decades? To address this question, *Fish to 2020* presents the first comprehensive economic analysis of recent rapid changes in the fish sector and gives the outlook for fish in the global food system over the next two decades.

Using a state-of-the-art model of the world food system, *Fish to 2020* examines the pressing problems of fisheries in the context of changing global and national market forces. It reveals that developing countries will shape nearly all growth in the fish industry in the next two decades and describes how new technologies and improved policies in both developed and developing countries can help create a thriving sustainable fish industry. This book is essential for anyone who wishes to understand the future of the world food system and the crucial role that fish can play. Highlights of the book are available in a food policy report and a brief.

To order, please contact:
worldfish-publications@cgjar.org

Or write to:

The Communications Unit
P.O. Box 500 GPO 10670, Penang, Malaysia
Tel: (+60-4) 626 1606
Fax: (+60-4) 626 5530



Obituary: Professor Dr Ahyaudin Ali

Professor Ahyaudin Ali, Deputy Vice Chancellor (Research and Development) of Universiti Sains Malaysia, passed away on 5 July 2003 at the height of his career and at the relatively young age of 48 years. He was a member of the Network of Aquaculture and Fisheries Professionals (NTAFP), council member of the Asian Fisheries Society (AFS) and a close friend of the WorldFish Center. He had a distinguished career at the Universiti Sains Malaysia, which he joined as a lecturer in the School of Biological Sciences in April

1984. He was promoted to Associate Professor in 1990 and to full Professor in 1998. His research on limnology was particularly well recognized and he was the Chairperson for the Limnological Research Group on Paya Indah Sanctuary, Malaysian Wetlands Foundation during 1997-98. He chaired the Advisory Committee of the Ramsar Center, Japan from 1997 until his demise, and also chaired the training program on the "Rice-Macrobrachium Integrated Farming System" initiated by DFID-UK and CARE

Bangladesh in 1988. He was awarded the Biwako Ecology Prize (Japan) in 2001, and was appointed Deputy Vice Chancellor (Research and Development) of Universiti Sains Malaysia in October 2001. Despite his illness, he valiantly shouldered his heavy workload. He was a good friend and partner to the WorldFish Center and shared many of its visions and missions. He left behind his wife, Nor Aaini Haji Ismail, and four children. With his untimely demise, the world of aquaculture and fisheries has lost an eminent scientist.

Obituary: Professor Surapol Sudara, leading marine conservationist in Thailand

Thirty years pushing marine conservation

The Bangkok Post
http://www.bangkokpost.com/News/20Jul2003_news02.html

Prominent environmentalist Prof Surapol Sudara died on 19 July 2003 after being diagnosed with liver cancer in June. He was 64 years old.

Prof Surapol was an adviser to the Natural Resources and Environment Minister, Praphat Panyachartrak, as well as the House Committee on foreign affairs in Thailand. He specialized in marine biology and coastal-area management. Mr Praphat noted that Prof Surapol was a well-respected environment expert who played an important role in founding the Ministry of Natural Resources and Environment. "Prof Surapol was a key

adviser to the Ministry, especially on the government's policy for marine and coastal management," he said. "His death is a great loss to the nation's environmental movements."

Prof Surapol retired as lecturer at the Department of Marine Science in 1999. He became president of the Sueb Nakhasathien Foundation, one of Thailand's most active environment NGOs, in September 2001. "Prof Surapol was a pioneer in raising public awareness on the degradation of marine and coastal resources," said Sueb Nakhasathien Foundation President Vanchai Tantivitayapitak. "His work alerted state agencies and the public to threats to marine and coastal ecological systems."

Prof Surapol had worked toward promoting environmental conservation for more than three decades. He was a

key opponent of the Nam Chon dam project in Kanchanaburi and had recently warned the government to scrap a proposed potash mine in Udon Thani Province due to the potential for severe environmental consequences. He was also concerned about the impact of mass tourism on coral reefs and other aspects of marine ecology.

Before his death, Prof Surapol chaired a subcommittee working on the restructuring of EIAs in Thailand. Environment Institute President, Dr Thongchai Panswad said Prof Surapol's attempts to protect Thailand's natural resources had been hampered by state agencies that were more interested in economic development.

Prof Surapol was married to Taveetiya Sukharom and had three children.

Obituary: Professor Dr Guy Teugels, scholar, partner and friend

Professor Dr Guy Teugels, Senior Scientist and Curator of the Ichthyology Collection of the Royal Museum for Central Africa (Musée Royal de l'Afrique Centrale, MRAC) in Tervuren, Belgium, and Professor at the Catholic University of Louvain, passed away on 22nd July 2003. Prof Teugels was a leading international expert on African freshwater and brackishwater fishes, especially catfishes, and aquatic biodiversity. He led many projects, interacted with numerous institutions in Africa, and published widely, in a number of languages, on taxonomy, species

revisions and descriptions, genetics, biogeography, ecology, aquaculture, and effects of deforestation, dam construction and industrial pollution on fish populations. In particular, he contributed significantly to the development of a number of definitive and pioneering works on African fishes, notably the *Check-List of the Freshwater Fishes of Africa (CLOFFA)* in 1991 and *Faune des poissons d'eaux douces et saumâtres de l'Afrique de l'Ouest. Tome I and II. Collection Faune Tropicale* in 1990 and 1992. More recently, he extended his research interests to freshwater

fishes of Indonesia and Vietnam. Prof Teugels was a long time collaborator of the WorldFish Center with his involvement in the development of FishBase, partner in research projects, and as a resource person in training workshops in Africa. His collaboration with the WorldFish Center started in 1991-92 through MRAC's involvement in and support to the WorldFish Center for the development of FishBase and, subsequently, in the technical reviews of data on African fishes in FishBase. With his untimely demise, the scientific world has lost a scholar, a partner and a friend.