

Bighead soup for lunch

As marine capture fisheries are approaching their limit, the culture of fish in natural or man-made ponds is now assuming a more significant role in providing food for people. Freshwater fish production requires very little capital outlay, and, with proper techniques, can result in very high yields of edible protein per acre.

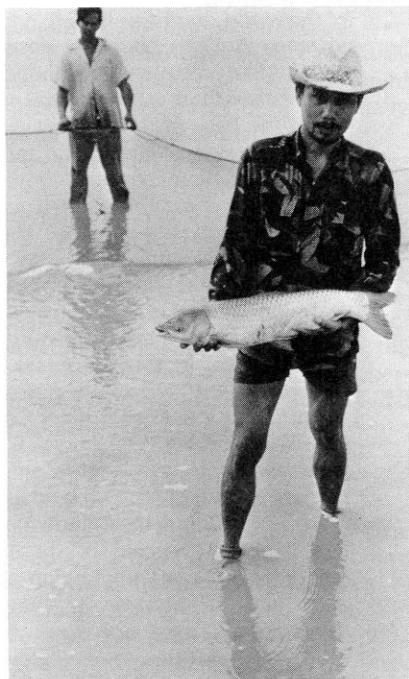
The Carps Malaysia Project was established as a result of the first seminar on aquaculture sponsored by the IDRC in Malacca, Malaysia, in April, 1973. That seminar identified a number of constraints on the increased production of fish seed: lack of trained personnel for research and extension in specific techniques, inadequately equipped research stations, marketing problems and lack of funds. These all appeared to be more or less common problems and demanded a coordinated effort among the countries of the region to help meet the enormous demand for protein in Southeast Asia.

The project in Malacca is being conducted by the Malaysian Agricultural Research and Development Institute (MARDI) at its Freshwater Fisheries Research Station — one of the larger and better equipped facilities of its kind in the region. It aims to provide the means of producing fish seed by induced breeding throughout the year, using pituitary hormone injections. Spawning, pond culture and feeding techniques will be standardized so that this knowledge can be extended to fish farmers throughout Malaysia and Southeast Asia.

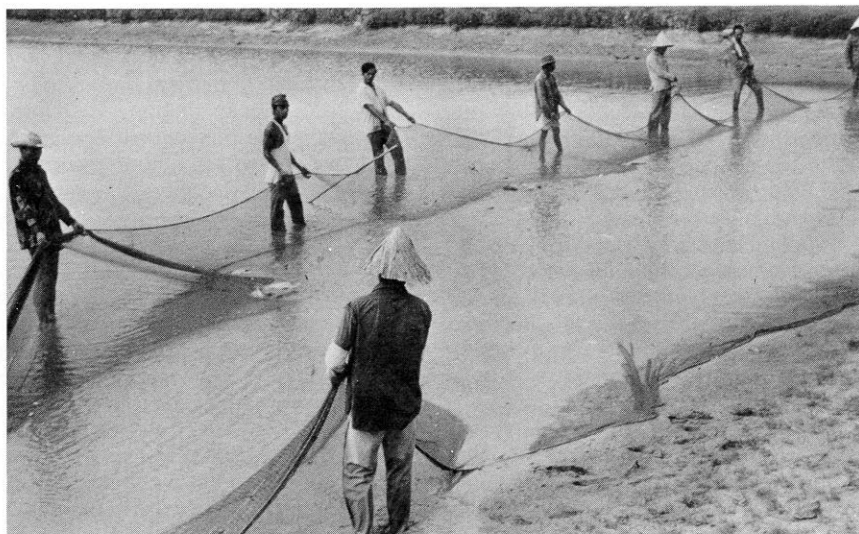
In the initial stages the spawning work has utilized purified salmon gonadotrophin supplied by Canada, since a continuous supply of carp gonadotrophin is not available in Malaysia. Later, a local source of gonadotrophin such as tuna is to be purified by the project. Such a source is essential if Malaysia is to become self-sufficient in its fish seed supply.

The project is being assisted by two project advisors, one in endocrinology and the other in nutrition. Each works closely with a research officer counterpart, both of whom are to receive specialized training overseas. In all there are 11 people working directly on the project. In addition the research effort has been augmented by two consultants. Dr. H. Chaudhuri, head of

the Central Inland Fisheries Research Institute substation at Cuttack, India, visited the station early in 1975 and assisted the team in developing proper techniques in collection, handling and transportation of spawners. He also demonstrated breeding and hatching techniques, preparation of hormone



Below: netting carp at MARDI research station. Above: worker displays grass carp specimen.



extracts and pond-rearing of post-larvae. Another benefit of Dr. Chaudhuri's visit was to establish liaison between the project in Malaysia and India, with the aim of comparing results in similar fish species at different latitudes. Dr. H.S. Bayley, of Canada's Guelph University, also visited the project to advise the team on nutrition. He identified the major areas for the carp nutrition research and suggested future equipment, training and advisory needs.

The main thrust of the project is to concentrate on the difficult-to-spawn Chinese carps: the grass carp *Ctenopharyngodon idellus*, the bighead carp *Aristichthys nobilis* and the silver carp *Hypophthalmichthys molitrix*. Once techniques for spawning these fish have been worked out it is planned that standardized spawning procedures can be widely applied to popular fish such as *Puntius gonionotus* and *Leptobarbus hoevenii* which are becoming rarer in natural waters. All these have great potential for fish culture, since most of them are either herbivorous or plankton feeders, and thus are very economical fish to cultivate for human consumption.

The exotic carps spawn naturally in their native temperate zone habitats of China and the USSR. Spawning takes place in swiftly flowing rivers, although the grass carp has been found to spawn naturally in reservoirs in Taiwan, Japan and Mexico. Courtship and spawning are stimulated by rising water levels caused by heavy monsoon rains, and the lowering water temperatures. In Malacca there is no such distinct monsoon period or cooler waters, so the fish lack the environmental stimulus occurring in their natural habitat. Water temperatures remain high and relatively stable all year round. These tropical environmental constraints have made it difficult to spawn Chinese carps at Malacca in the past. The station is almost on the Equator.

So far the project has had limited success, however, in the induced

Wood - th neglected

spawning of carps using salmon gonadotrophin. Thirty-three percent of the silver carp tested and 37.5 percent of the bighead carp tested have been induced to spawn. Grass carp, traditionally the most difficult of the Chinese carps to spawn in the tropics, have yet to be successfully spawned.

One of the difficulties experienced at the station so far has been the lack of adequate numbers of sexually "ripe" fish. It may be that the failure of the fish to spawn is due to this reason and not to potency of the hormone. Several new preparations of salmon gonadotrophin have been provided by B.C. Research of Canada, and comparative potency tests will be carried out using these extracts on the "Java" carp *Puntius gonionotus*.

One very positive result of the project has come from the nutrition experiments on the brood stock of the grass carp and bighead. It was found that when proper feeding techniques were applied — such as phosphates, Napier grass and rice bran — a very much improved gonadal development was achieved.

The nutrition team is also working on techniques for the production of live food for the carp fry. *Moina*, a small crustacean, is now being mass-produced using chicken dung as fertilizer. Bighead fry raised solely on *Moina* exhibit a survival rate of well over 90 percent. Formulating feeds from cheap, locally available materials is one of the primary objectives of the nutrition team.

As in most IDRC-supported projects, training is an important aspect of the carps project. Two of the Malaysian assistants have attended four-week courses on fish culture techniques in Indonesia. Another took a six week course on induced breeding and pond management at Cuttack, India, and the Malaysian nutritionist will study for an MSc. at Cornell University's Tunison Laboratory of Fish Nutrition. This should give MARDI the expertise to do very extensive long-term research on the nutritional requirements of any kind of fish.

Towards the conclusion of the project in 1977, the results will be discussed with representatives from other Southeast Asian countries at a seminar to be held in Malacca. A pilot hatchery, incorporating the principles developed in the project, will be constructed and used as a centre for training people in all aspects of spawning techniques.

It is anticipated that through this method MARDI can help to increase the fish seed supply for growing fish as human food in Malaysia and the region. Who knows, there may even be a market for bighead soup in Canada!

This article is based on a report compiled by the project staff — A. Tajuddin, E.G. Watts and J.D. Funk and program management staff W.H.L. Allsopp and F.B. Davy.

Wood, widely used as a construction material in many parts of the world, has been largely neglected in many Andean countries despite the vast timber resources available. Cultural rather than technological reasons are at the base of this neglect: Spanish tradition favours brick and concrete houses, and many people believe wood structures to be shorter lived and less secure. The fact that wood is extensively used in slum dwellings means that it is labelled a "poor man's material", and thus has inferior status.

The region's timber resources are considerable. In total, tropical forests cover some 220 million hectares of the countries of the Andean Pact Commission — Colombia, Venezuela, Ecuador, Peru and Bolivia — representing 60 percent of their combined land area.

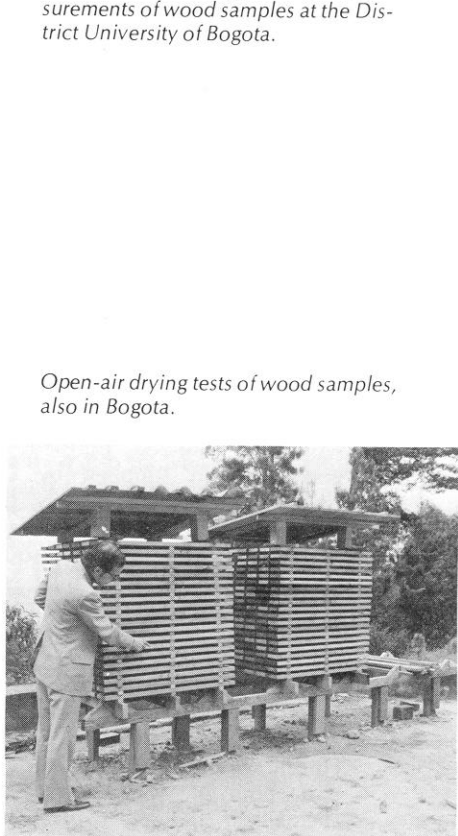
Recent studies have indicated that less than 0.1 percent of these forest resources are currently being utilized and that 80 percent of the wood harvested is used for fuel. Of the estimated 2500 tree species growing in the region, only about 50 are now used commercially. Yet, as many as 400 of the most abundant species may have commercial value.

The building industry provides by far the most important market for timber products throughout the world. The only way to make a significant breakthrough in tropical timber utilization in the Andean region, therefore, is to penetrate this market. The greater utilization of the timber resources could also help to solve the region's acute housing shortage, making more low-cost houses available in both rural and urban regions.

In 1971, the Andean Pact Commission began a series of studies aimed at establishing a science and technology program that would stimulate economic and social development in its five member countries. One of these detailed studies was on the use of forest products and it highlighted the need for research into the technological properties of many lesser known species.



Researcher recording precision measurements of wood samples at the District University of Bogota.



Open-air drying tests of wood samples, also in Bogota.

Photos: Jaime Rojas