

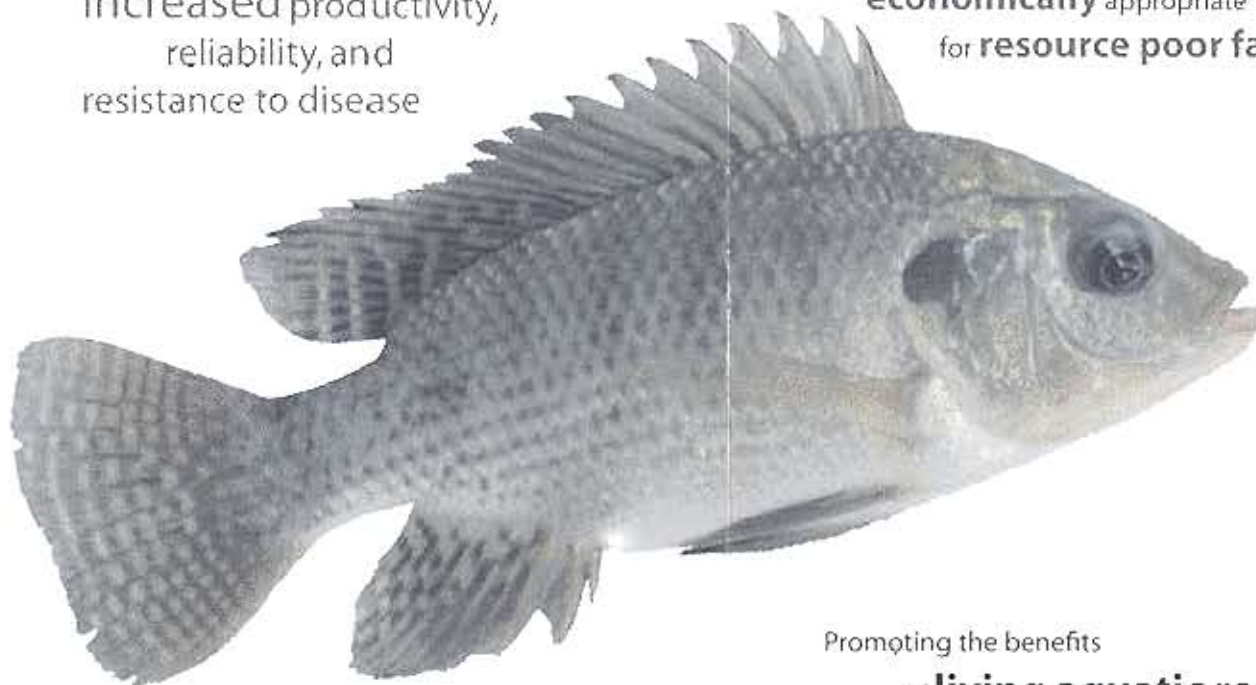
Jitra Research Station, Kedah, Malaysia. Their first progeny were produced during January-February 2002. The parents of the next generation were then selected for the breeding program that is currently underway.

To meet the rise in interest in fish genetic improvement in developing countries, the WorldFish Center has established the **International Network on Genetics in Aquaculture**. It facilitates the development of national or regional breeding programs for genetic improvement of carp and tilapia, and the transfer of genetic material among member countries – following strict quarantine protocols. The network has disseminated the GIFT strain to 11 countries in Asia and the Pacific notably Bangladesh, China, Fiji, India, Indonesia, Lao PDR, Malaysia, Sri Lanka, Papua New Guinea, Thailand and Vietnam.

With the assistance of UNDP, a technical cooperation program has been initiated among developing countries in sub-Saharan Africa and Egypt. This project aims to transfer the GIFT technology developed in the Philippines to Cote d'Ivoire, Egypt, Ghana and Malawi. Two training programs have been held, the base population stocks established and selection programs initiated.

The GIFT story provides the first-ever documented successful breeding program for tropical fish. Over a dozen countries have now adopted the methods used in this major scientific breakthrough, using improved fish strains. Farmers and their families can now generate more income and meet their nutritional needs.

Increased productivity,
reliability, and
resistance to disease



Fisheries and aquaculture technologies that are **socially and economically** appropriate for **resource poor farmers**

Promoting the benefits
of **living aquatic resources**
through **sound**
environmental management



WorldFish
C E N T E R

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the GIFT strain and GIFT technology, please contact:

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A True Gift:
Benefiting Farmers through the GIFT Project
(Improved Farmed Tilapia)



Filling the gap between supply and demand:

The demand for fish is rising worldwide. Most capture fisheries are already fully or overexploited. Aquaculture must supply an increasing proportion of the world's future demand.

One of the most commonly cultured freshwater fish is the 'tilapia', a group of fish of African origin that belong to the cichlid family. *Oreochromis niloticus* – the Nile tilapia – is probably one of the first fish ever to have been cultured. It is shown on Egyptian tombs dating back more than 3,000 years.

This species has a number of characteristics that make it suitable for culture. It will tolerate crowding and brackish water quality, it shows good resistance to many bacterial, viral and parasitic diseases and it will eat a variety of food.

The Nile tilapia is a mouth brooder. The eggs are fertilized externally in a nest excavated by the male; then the female secures them inside her mouth throughout the incubation period and for several days after hatching. The young fry may swim in and out, exploring their surroundings but returning to the safety of mum's mouth for refuge. The males do not help with this duty!

Research conducted on tilapias in the late 1970s by the WorldFish Center and its African and Asian partners led to the conclusion that the lack of productive stock was a major limiting factor to the expansion of the aquaculture industry. With the assistance of African, Belgian, German, and Israeli scientists, four wild populations of Nile tilapia from Africa (i.e. Egypt, Kenya, Ghana, and Senegal) were transferred to the Philippines. These and four other

strains that were used by farmers in Asia (known as the Israel, Singapore, Taiwan, and Thailand strains) were bred together to build up a base population for selective breeding.



Philippine research agencies, AKVAFORSK (Norway) and the WorldFish Center joined forces in a major collaborative effort.

The Genetically Improved Farmed Tilapia (GIFT) Project bred a new strain of improved Nile tilapia for Asia that grows up to 85% faster and has up to 50% higher survival rate than other strains. The GIFT fish have been improved by traditional methods, not genetically modified by the introduction of genes from other species. The fish have been selectively bred to enhance their positive characteristics.

The GIFT technology involves establishing base populations from a wide variety of sources to ensure a broad genetic base; controlling reproduction; growing out the fish in conditions that truly represent the intended production systems; individual identification of each fish and selection of the genetically superior ones as breeding stock for the next generation.

In some trials market weights were reached with 20-30% lower production costs. GIFT captured 25% of the tilapia fingerling market in the Philippines in only its third year of commercial distribution and this level has continued to the present.

From 1994 to 1997, the genetically improved breed was tested in the P.R. China in different agro-ecological regions in controlled trials on farms and at testing stations. Similar trials were carried out in Bangladesh, the Philippines, Thailand, and Vietnam. In the P.R. China, although tilapia aquaculture was already well established, the GIFT strain still achieved remarkable success, with an 18% greater growth rate than existing strains that were being farmed in similar conditions. The GIFT strain is now being disseminated all over the P.R. China.

So far, the GIFT strain has only been selected to improve growth performance. However, the GIFT technology enables selection to improve additional traits (e.g. fillet yield, flesh quality) that may be important for tilapia farming.

In 1997 the WorldFish Center and its research associates in the Philippines established the GIFT Foundation Inc. as an independent non-profit organization in order to help disseminate and commercialize the GIFT strain through partnerships with the private sector. The new strain is now being distributed very successfully through the Foundation.



More recently, a new research program has been developed with our Malaysian partners; families of GIFT received from the Foundation in the Philippines were successfully introduced at the