

Development of the Genetically Improved Farmed Tilapia (GIFT)

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Background – problem identification

- WorldFish and partners' research on Tilapias, which began in late 1970s, indicated that inadequate seed supply and deteriorating performance of the fish in many aquaculture systems in Asia were a major bottleneck for aquaculture
- In Africa, aquaculture production was in its infancy, and wild stocks of native tilapias were under threat due to habitat degradation, uncontrolled fish transfers and over-exploitation

Project planning

In 1987 WorldFish brought together partners from Asia and Africa, as well as international experts to review the status of Tilapia genetic resources.

As an outcome of this meeting a decision was made:

To undertake a major research project on genetic improvement of tropical finfish.

Why tilapias?

Tilapias are farmed in more than 85 countries.

They have many desirable qualities: stocking density, resistance to diseases, opportunistic omnivorous...

Most tilapias stocks in the world were of poor genetic quality.



Genetically Improved Farmed Tilapia GIFT

Objectives

- Develop a method applicable to tropical species
- Develop a faster growing strain
- Preferably, suitable for low and high input systems



GIFT Project

**Wild: Egypt, Ghana,
Kenya, Senegal**

Founder populations

**Farmed: Israel, Singapore,
Taiwan PoC, Thailand**



Experimental design



Founder populations



8 x 8 diallel cross = 64



Cross breeding (?)



Heterosis low



Pure breeding

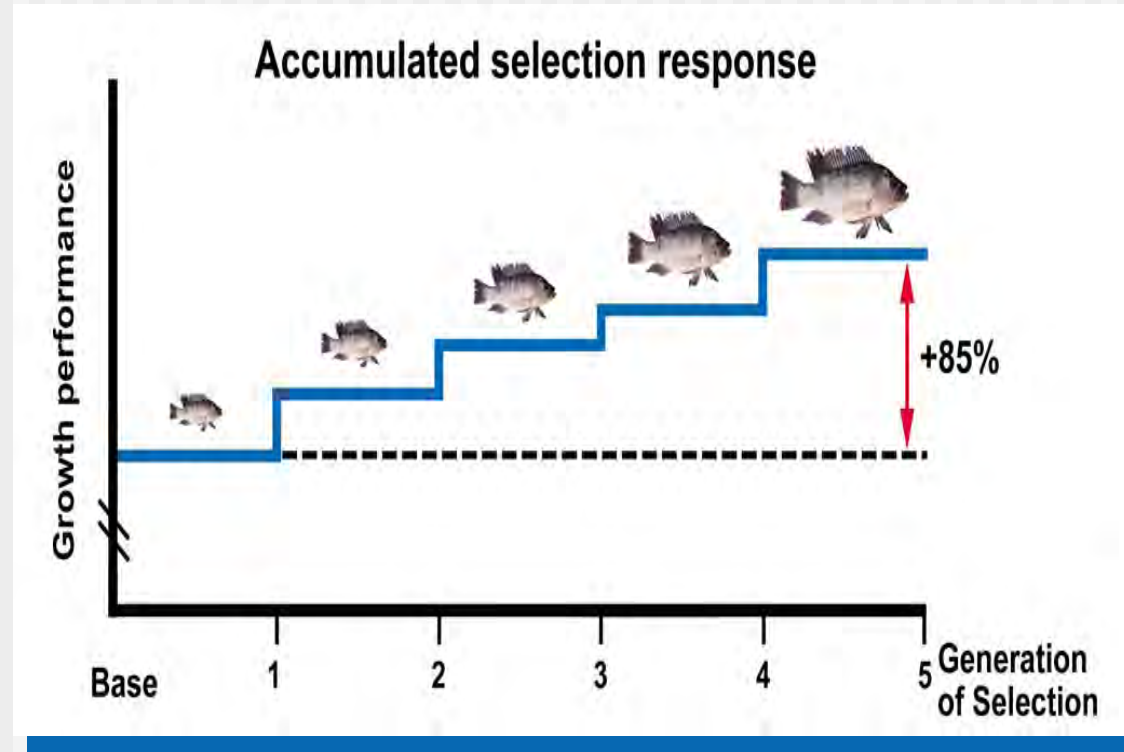
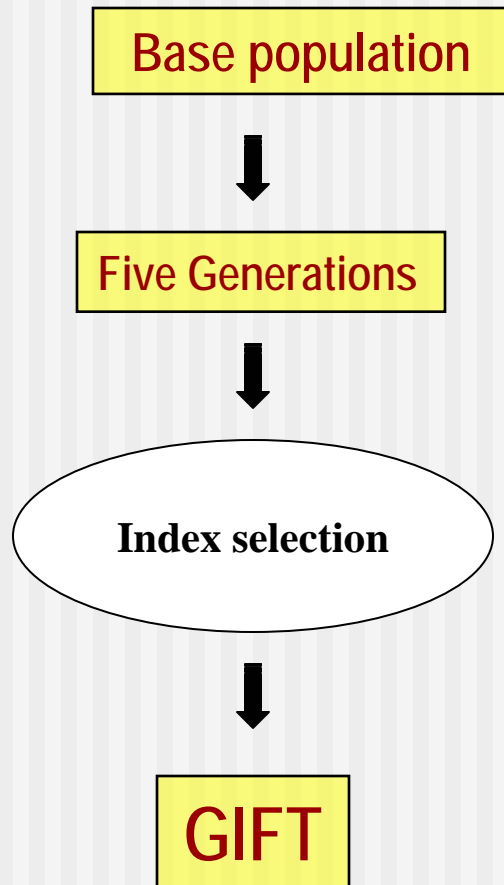


Genotype by Environment
Low



Develop one strain

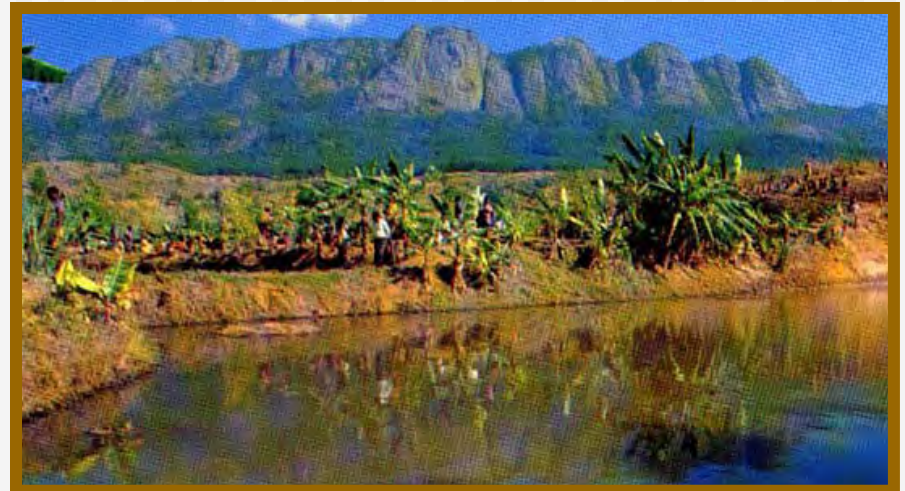
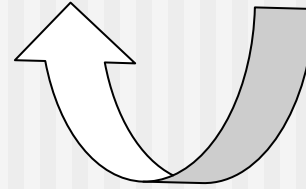
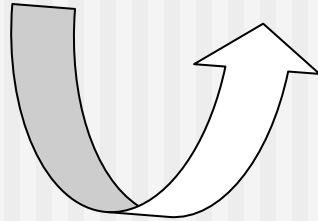
Selection program: results



Evaluation and Dissemination

**Agro ecological
Production systems
Culture systems**

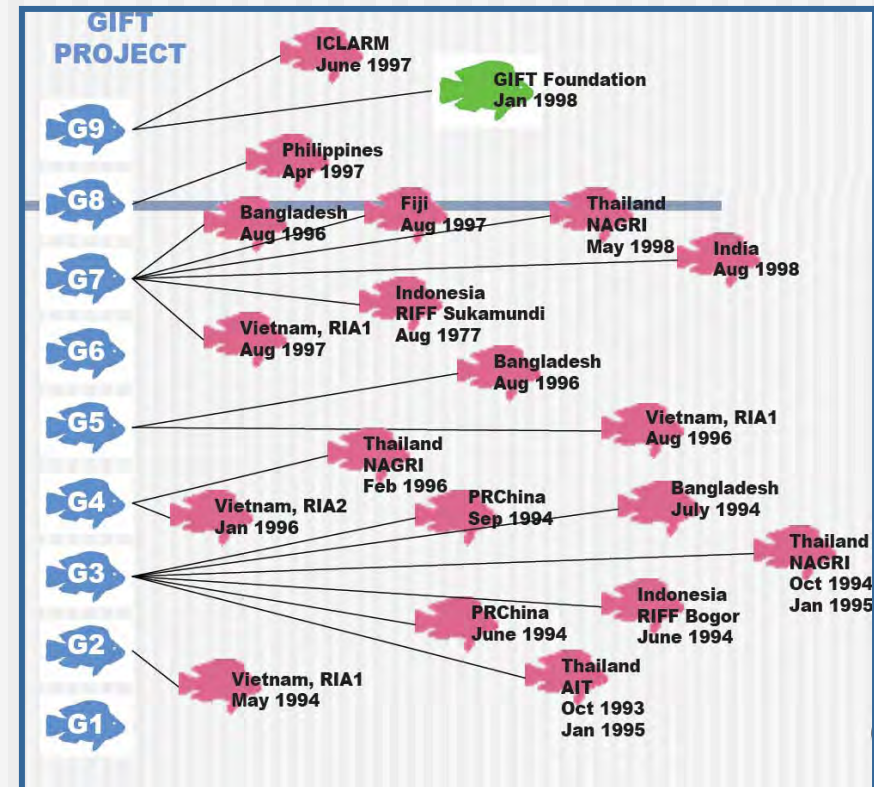
**Bangladesh, China,
Philippines, Thailand
Vietnam**



Dissemination

GIFT has been disseminated to 11 countries in the Asia and Pacific regions and to Brazil and Costa Rica in Latin America.

GIFT has captured 69, 36, and 24 per cent of the market in Philippines, Thailand and Vietnam, respectively



Lessons learned

- The application of quantitative genetics to the genetic improvement of aquatic animals is possible and has beneficial results
- The technology can be applied to other aquatic animal species, such as carps
- The effective dissemination of the improved strain poses a major challenge, and skilled human resources have to be assigned to the task to ensure the fish reach the farmer
- Partnerships among national institutions and scientific ones in developing countries can play a major role in accelerating research
- Partnership between governmental institutions and the private sector has resulted in a faster and wider dissemination process
- The GIFT tilapia experience highlighted the need for an institutionalization of a country specific follow up program once the strain has been transferred and disseminated.

Keys to success

Conventional

- Accurate problem identification and sound project design
- Conduct for enough generations
- Testing and demonstration of superiority of GIFT strain
- Farmers' involvement in evaluation
- Appropriate structure for dissemination put in place
- Publicity and promotion of results

Not so conventional

- Enthusiasm and commitment of all involved
- A wise choice of project name → GIFT

Could have received greater attention

- Offer of additional services (feed, management)