

Performance of the GIFT strain under various farming systems in Sri Lanka

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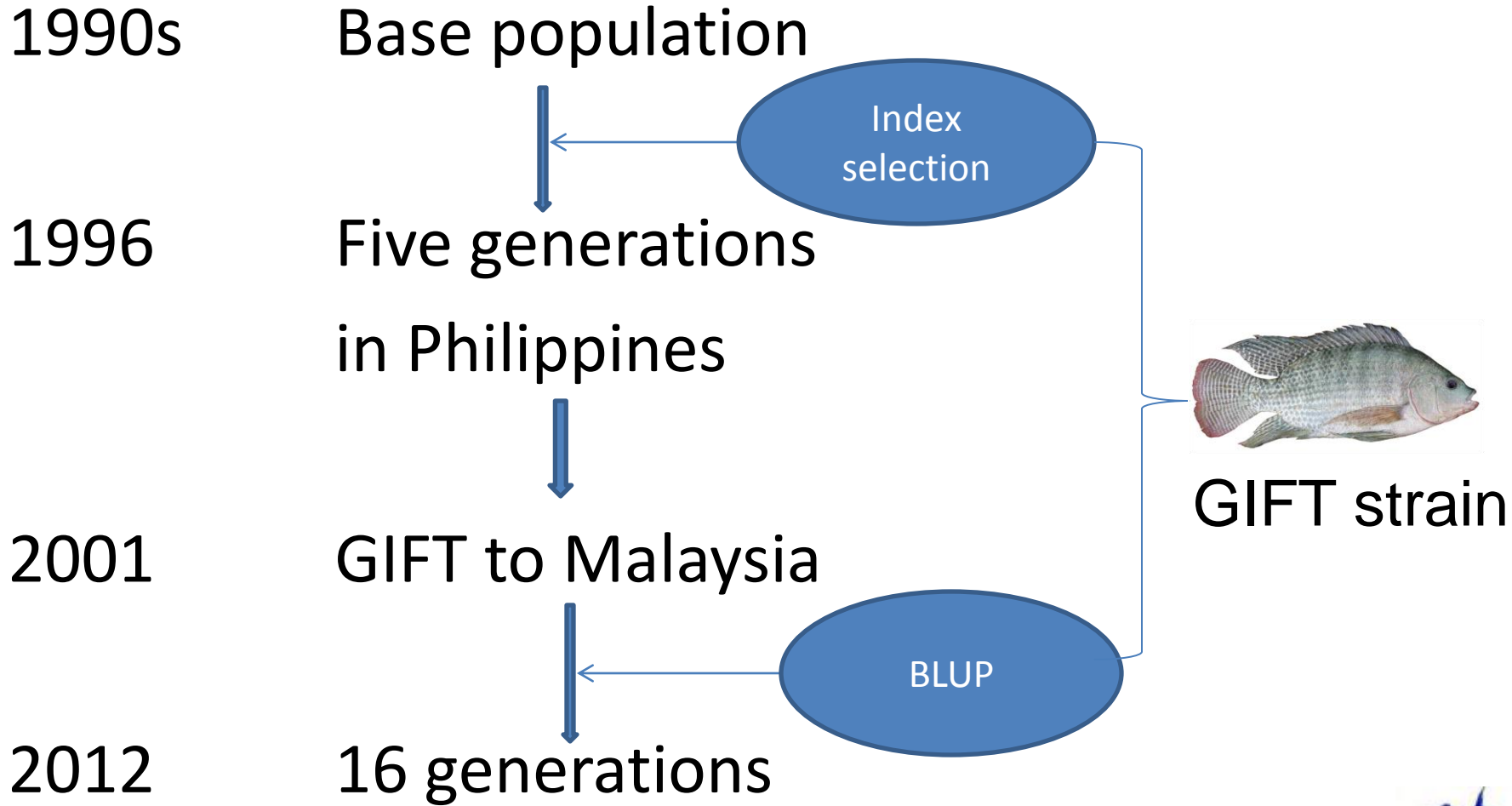
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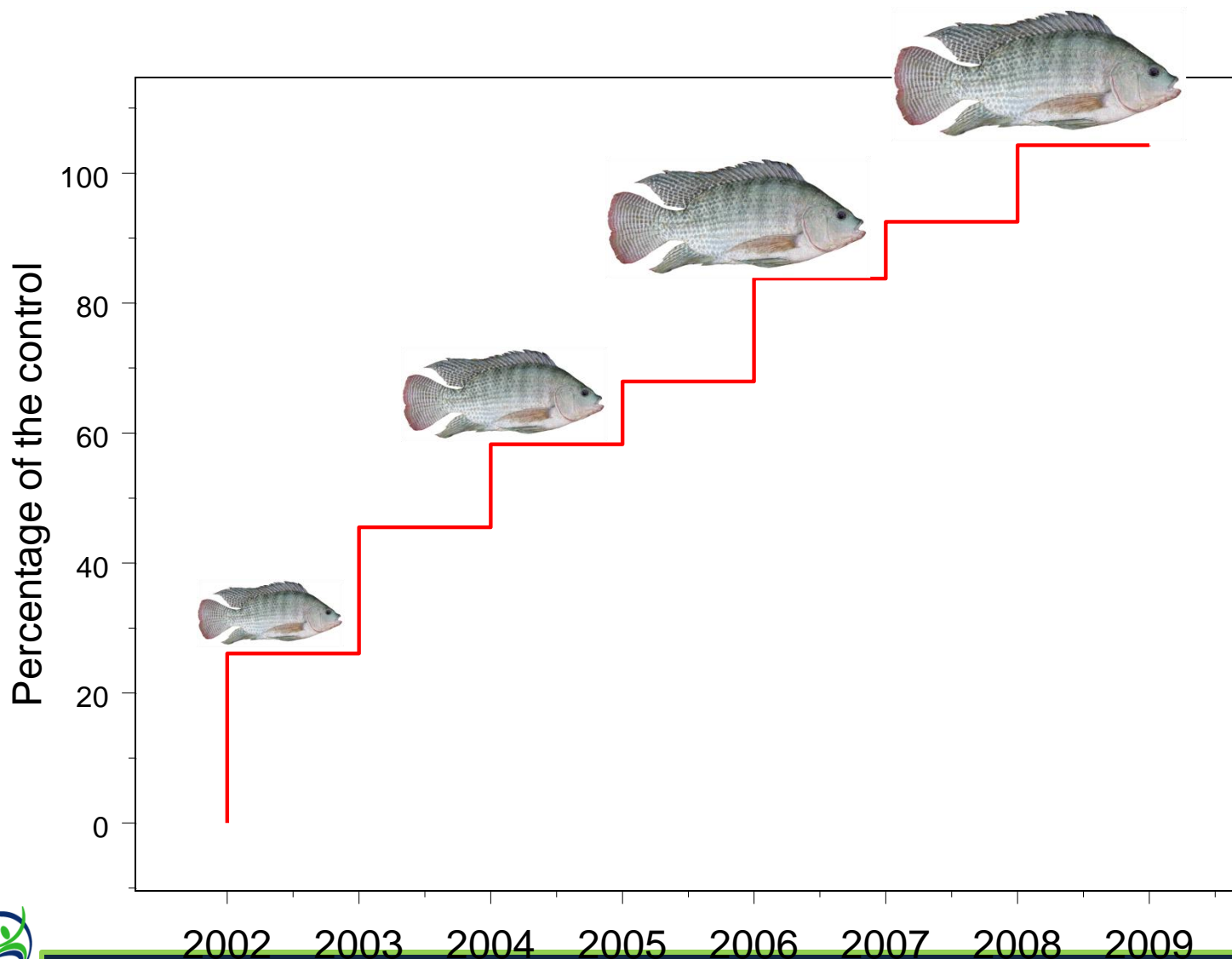


Background: History of GIFT



GIFT strain

Improvement of body weight in the GIFT strain



GIFT distribution

14 different countries
68% in Philippines
30-40% in Thailand
and Vietnam
Booming in Bangladesh



GIFT in partner countries

- Satellite nuclei (pedigreed populations): Bangladesh Fisheries Research Institute (BFRI), Chinese Academy of Fisheries Science, FFRC in Wuxi China, and Research Institute for Aquaculture (RIA1) in Vietnam
- Cohort breeding scheme: Philippines, Sabah and Sarawak of Malaysia, BRAC in Bangladesh, Sri Lanka, Costa Rica

GIFT in Sri Lanka

- In 2007, WorldFish initiated a “brood stock development program in Sri Lanka” in collaboration with NAQDA, mainly for GIFT tilapia and local rohu (*Labeo dussumieri*)
- Local rohu: Full pedigree population
- GIFT: Simple cohort breeding in combination with rotational mating

Cohort breeding for GIFT in Sri Lanka

- The Jitra center sent 50 different families (20-40 fish per family) to NAQDA in June 2007
- Randomly group five unrelated families to stock in each pond, tank or cage until harvest
- The heaviest fish within each pond are selected as parents of the next generation
- Animals selected in one pond are mated with those selected in another one to avoid the mating of close relatives
- 2012, seven cycles of selection were conducted at NAQDA

Layout of the program



Research questions

- In 2009 a strain evaluation experiment was conducted to compare performance and survival of GIFT vs. existing cultured stock
- Our main aim was to examine whether GIFT can be cultured in prevailing production environments in Sri Lanka, i.e. Ponds, seasonal tanks and reservoirs?

Experimental design

GIFT



Synchronized spawn



Local stock

Separate rearing



Fin-clip tagging



Communal grow

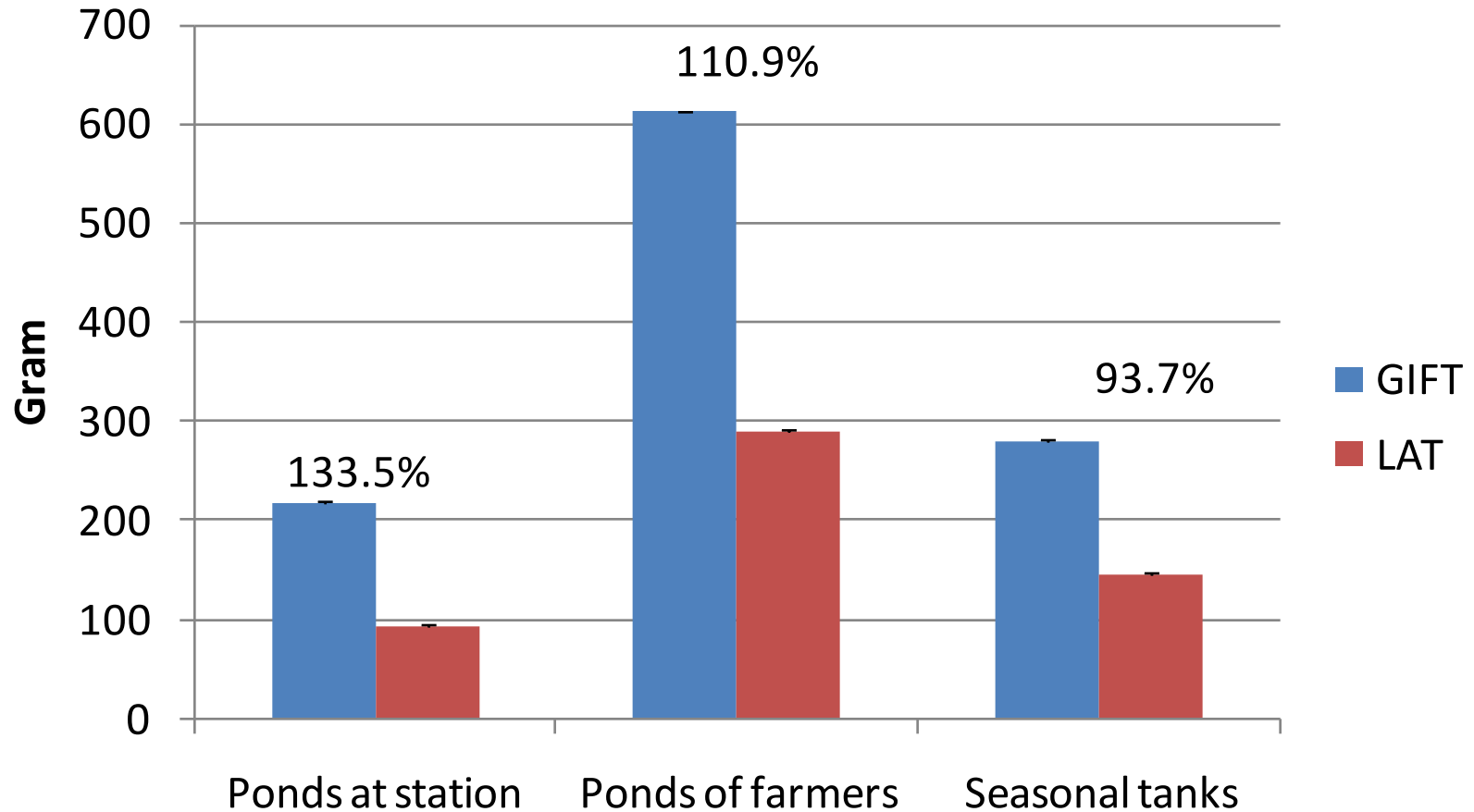


2 reps per location

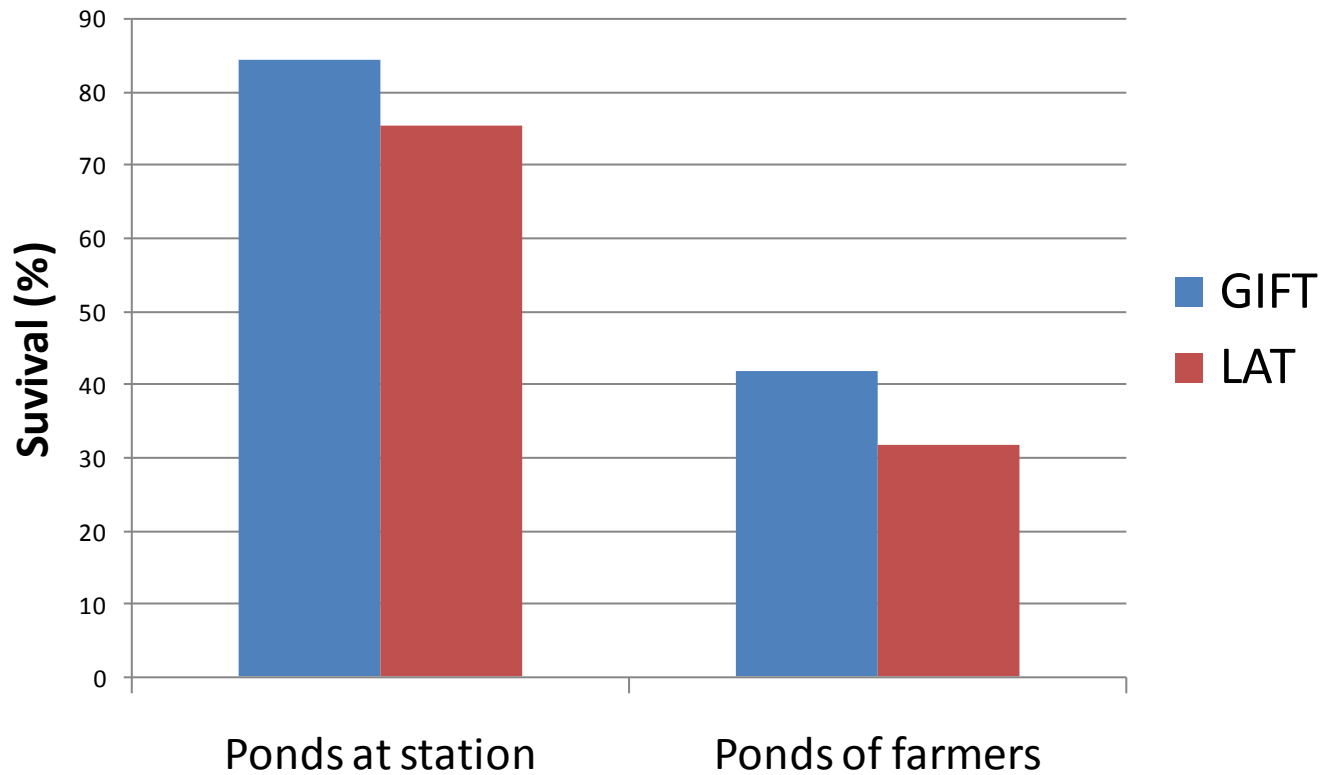
Grow-out and measurements

- Standard grow-out production practices
- Body traits: Weight and length
- Survival from stocking to harvest

On-farm test of the GIFT strain in Sri Lanka



Survival (%)



Local stock vs. GIFT at harvest

LAT vs. GIFT



G×E in tilapia

- The superior performance of GIFT across production systems in Sri Lanka is consistent with our estimates of the genetic correlation between the expressions of body weight in different environments ($r_g = 0.78$)
- We conducted a series of experiments to investigate G×E in tilapia

Results

Exp	Environment	Genet corr.
1 (Philippines)	Ponds	0.76 – 0.99
	Cages	0.99
	Ponds vs. cages	0.36 – 0.82
	Ponds vs. Rice-fish	0.95 – 0.98
2 (Malaysia)	Pond vs. cage	0.70
3 (Egypt)	High vs. low input	0.79
4 (Vietnam)	Fresh vs. salinewater	0.45



Remarks

- GxE effect on body traits is generally mild in tilapia ($r_g = 0.78$), indicating that the GIFT strain can perform well across farming environments
- GxE however occurs when the test environment differs largely from the targeting farming systems, e.g. fresh vs. saline water

Dissemination of GIFT in Sri Lanka

- Currently 30 local hatcheries have received the improved strain
- About 230 community based organizations and farmers have cultured the GIFT strain
- GIFT has contributed to the increase in inland fisheries and aquaculture from 10 to 13.5%

Conclusions

- GIFT perform well across common farming conditions and culture environments
- GIFT have had a large impact on smallholders in partners countries
- GIFT was chosen to feature in MillionsFed

