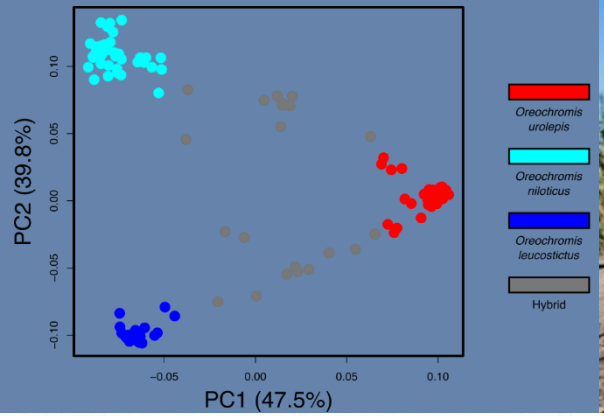
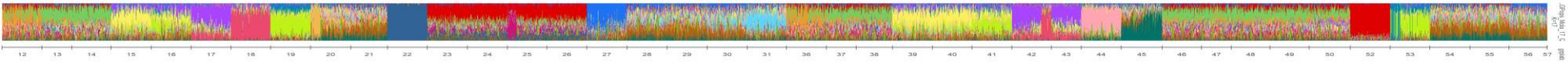
WorldFish genetic research program





John Benzie

Penang, 18th September 2022

WorldFish

CGIAR

A program built from bilateral and CGIAR initiatives

Genetic resource and needs assessment enabling planning, policy development and implementation	TrueFish – tilapia resources in East Africa Profishblue – regional support Southern Africa EU and IFAD – access and benefit sharing CGIAR initiatives – trait preferences
Genetic improvement programs and advice enabling adaptation, production gain	CGIAR initiatives – carp, tilapia USAID FIL – carp BMGF/USAID – tilapia carp catfish ICAR/RGCA – carp and tilapia
Genetic tools enabling more efficient gain, resource assessment	CGIAR initiatives – carp, tilapia BBSRC partner support

A sum greater than the parts

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The State of the World's Aquatic Genetic Resources (AqGR) for Food and Agriculture. FAO 2019

AqGR are relatively under developed, many farmed species are still essentially wild type.

FAO global plan of action calls for accelerating the appropriate development of AqGR for aquaculture.

Genetic improvement is key to efficiency of production and adaptation to climate change.

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Improved resilience and genetic gain in fish

DEVELOPMENT OF NEW IMPROVED STRAINS

Assessing traits

market, gender, inclusiveness

Developing enabling technologies (husbandry methods; genetic tools; best management practices)

Enabling partnerships (private sector, government)

GREATER PRODUCTIVITY, EFFICIENCY AND PROFITABILITY OF FARMING SYSTEMS

Improved growth strains available

substantive gain demonstrated

Assessing on-farm performance (identifying and solving yield gaps)

Extending partnerships (business development and scaling)

MORE SUSTAINABLE, RESILIENT AND NUTRITIOUS FOOD SUPPLY

Resilience traits available (cost effective phenotyping)

Rapid gain (genomic selection, index selection**)**

Extending partnerships (product lines and geographical range)

AFRICAN CATFISH **CARPS** **TILAPIA**

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Available Genetic Resources

Improved nucleus breeding populations

- Nile tilapia (GIFT) Malaysia 17 generations
- Abbassa strain Egypt 15 generations
- Rohu carp 3 generations
- Silver Carp 2 generations
- Catla carp 1 generation
- African catfish being scoped

Response to selection for growth: 7-12% per generation.

Tools creating genetic gain in complex (resilience) traits

60K SNP chip focused for tilapia strains

Full genome sequence for GIFT tilapia

Genomic data in relation to growth, feed efficiency, sex determination, TiLV resistance, oxygen efficiency

Molecular markers for carps

Collectively 28% of world aquaculture finfish production

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WP4 – AquaGenetics: Delivering gains from genetic improvements in farmed fish through public-private partnerships

Pathway 1. Better performing strains of carp, tilapia and African catfish

Pathway 2. More rapid and sustained delivery of improved strains to smallholder farmers

Pathway 3. Improved performance in farming systems

Nigeria, India and Bangladesh

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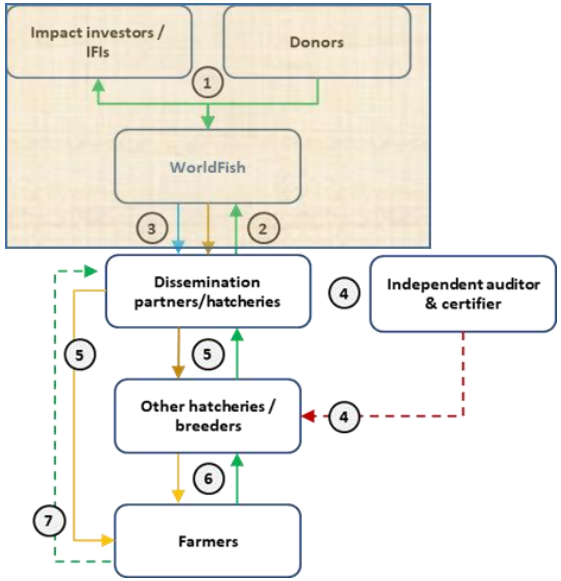
Accelerating genetic gain and its delivery into aquatic food systems – maintaining investment and achieving scale of impact



- Creating and maintaining improved strains and key technologies
- Delivering improved strains into production systems
- Managing aquatic genetic resources

Globally competitive research group to create new genetic technologies and dissemination pathways for aquaculture and novel funding methods

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Futures

New species

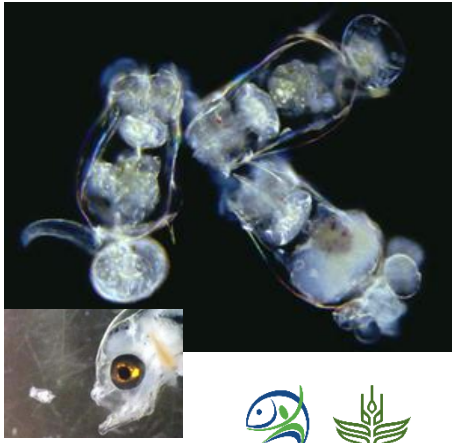
New traits

New technologies

Synergies

Impact scale

SDG outcomes



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Scope of work

Summary of the week

Mon 17th	Preparation day at WorldFish.
Tues 18th	**Workshop Day 1. Presentations from groups**.
Wed 19th	**Workshop Day 2. Planning for 2023-2024.**
Thurs 20th	**Workshop Day 3. Scoping futures to 2030.**
Fri 21st	Follow-up meetings among participants.

Thank You

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