

# Production of all males tilapia through hybridization



Presenter

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# Challenges of culturing mixed sex tilapia

- Early sex maturation
- Prolific reproduction of tilapia
  - Overcrowding
  - Small growth rate
  - Size variation
  - Less profit



- Culturing monosex tilapia is a solution to overcome those challenges:
  - Physical selection
  - Sex reversal
  - YY super male
  - Hybridization



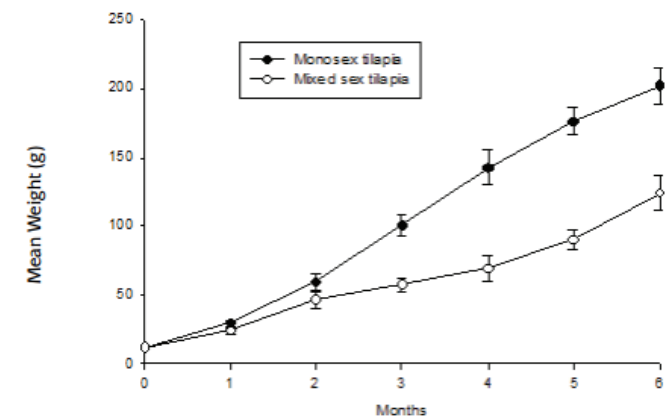
# Why all males are concerned?

- There is growth differences between sex (Chakraborty and Banerjee, 2010)
- Tilapia < > salmonids
- monosex populations help to reduce unwanted reproduction

## MIXED SEX V'S MONOSEX TILAPIA

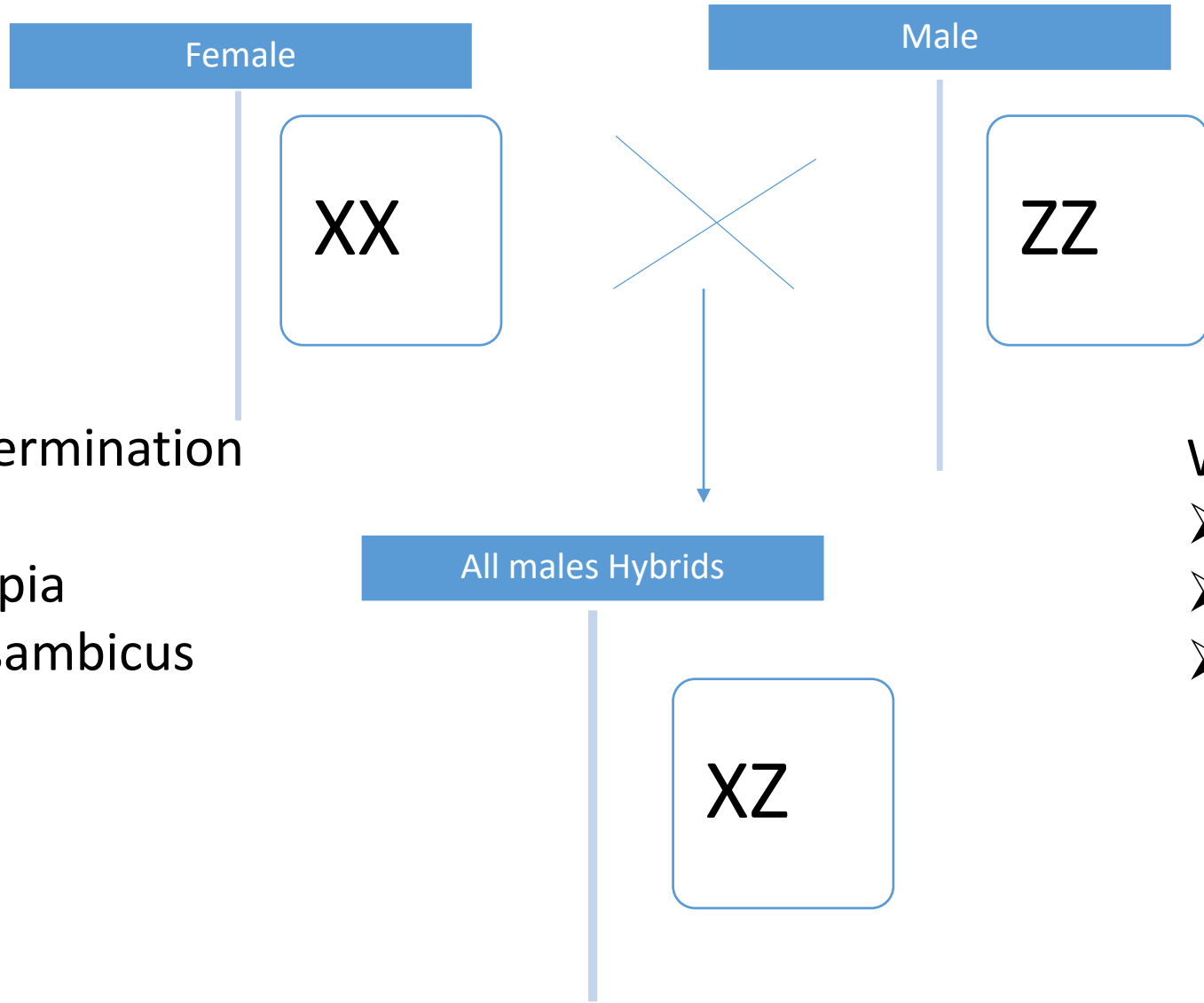


After six months, the average weight of male monosex was  $200.8 \pm 0.81$  g and mixed sex  $123.4 \pm 0.76$  g, respectively (Githukia *et al.*, 2015)



Monthly mean weight  $\pm$  SE of male monosex and mixed sex *O. niloticus* fish

# Theoretically producing all males



XY sex determination system

- Nile tilapia
- *O. mossambicus*

WZ sex determination system

- Bleu tilapia
- *T. hornorum*
- *O. karongae*

# Practically

- ♀ *O. aureus* x ♂ *O. niloticus* 4.28: 1.00 (male- female)
- ♀ *O. niloticus* x ♂ *O. aureus* 3.59: 1.00 (male- female)

Produced progeny were not all males as targeted (El-Zaeem & Salam, 2013).

- ♀ *O. aureus* x ♂ *O. niloticus* 3: 1 (male- female)
- ♀ *O. niloticus* x ♂ *O. aureus* 1: 0 (male- female) all males

Less purity of parents especially when hybrids look like pure species

# Bunda Fish Farm Research on going

## **GROWTH AND REPRODUCTIVE PERFORMANCE OF THREE *Oreochromis* HYBRIDS UNDER DIFFERENT MANAGEMENT REGIMES**

### **Species used for hybridization**

- **Oreochromis Karongae (OK)**
- **Oreochromis shiranus (OS)**
- **Oreochromis mossambicus (OM)**

### **Activities**

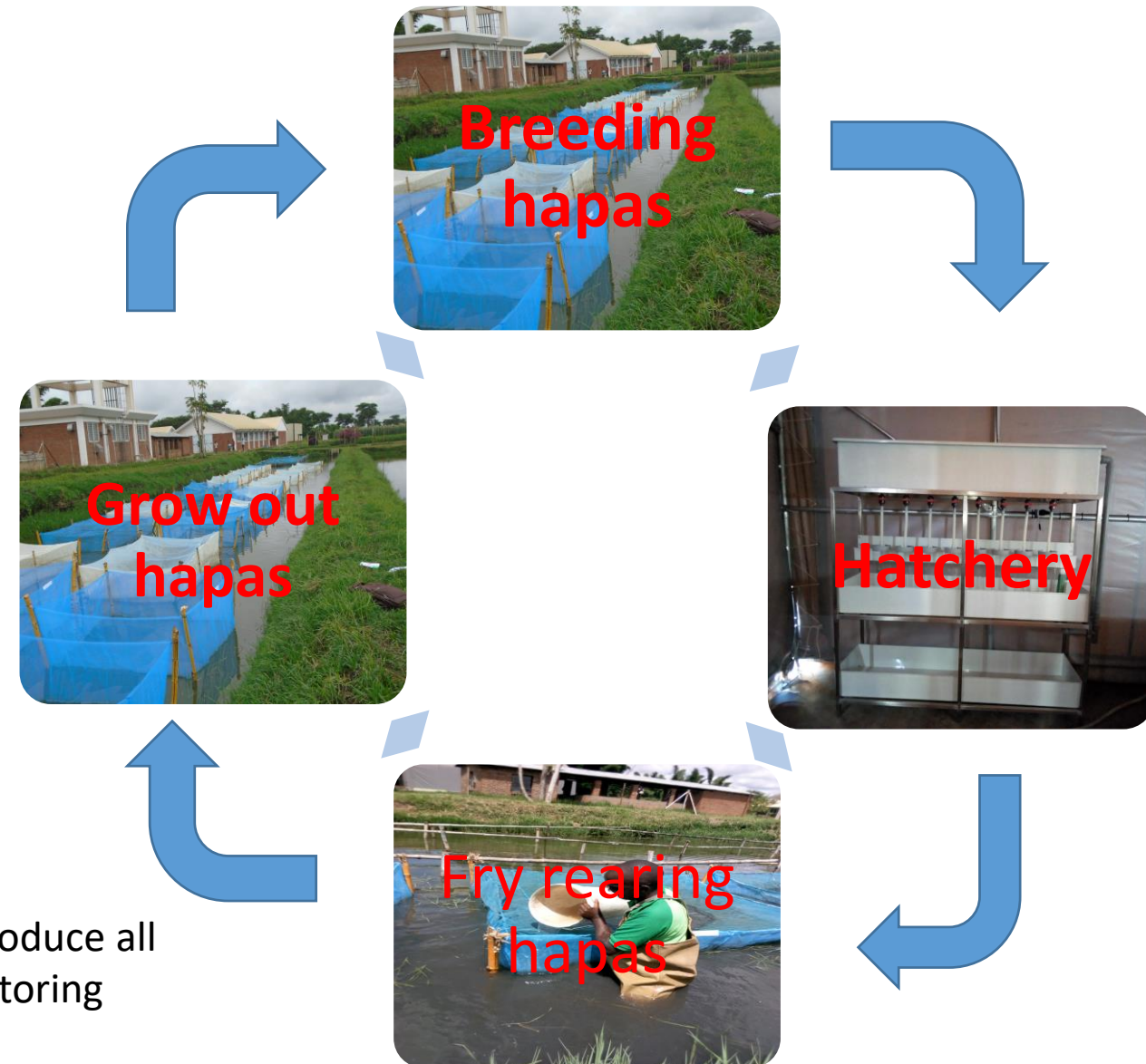
- 1 Collection of brooders: O.Karongae from Lake Malawi and O Shiranus & O mossambicus from shire river**
- 2. Conditioning brooders at the farm: O.Karongae & O Shiranus in pond and O mossambicus in tank**
- 3. Selection criteria were :Size selection, Health of the fish, readiness and sex of the fish**

# Set up of the experiment

Female	Male	Offspring
OM	OK	Hybrid
OM	OS	Hybrid
<b>OM</b>	<b>OM</b>	<b>Pure</b>
OS	OK	Hybrid
<b>OS</b>	<b>OS</b>	<b>Pure</b>
OS	OM	Hybrid
<b>OK</b>	<b>OK</b>	<b>Pure</b>
OK	OS	Hybrid
OK	OM	Hybrid

The objective was to find out which of the 9 combinations can produce all males offspring or high percentage of males offspring, then monitoring growth of the hybrids

## Diagram of our research



# Preliminary Observations

- The three *Oreochromis* species can crossbreed each other and produce offspring
- The combination where *Oreochromis karongae* was a male have registered less number of fry compare to other males.
- The combination where *Oreochromis karongae* was a female have registered less number of spawner

# Conclusion

- ❑ Hybridization is possible between the three *Oreochromis* species
- ❑ Males are preferred due to their high growth
  - All the energy will be used for muscle development, not for reproduction
- ❑ most tilapia hybrids are fertile, which means that they can mate with pure lines.
  - It need careful handling to prevent a possible mating with pure line.

# References

- El-Zaeem, S. Y., & Salam, G. M. (2013). Production of genetically male tilapia through interspecific hybridization between *Oreochromis niloticus* and *O. aureus*. *Iranian Journal of Fisheries Sciences*, 12(4), 802-812.
- Kassam, D., & Sangazi, M. (2016). Comparative Growth Performance of *Oreochromis* Hybrids and Selectively-Bred Strain (F8) in Malawi. *Sustainable Agriculture Research*, 5(526-2017-2643).
- Chakraborty, S. B., & Banerjee, S. (2010). Comparative growth performance of mixed-sex and monosex Nile tilapia population in freshwater cage culture system under Indian perspective. *International Journal of Biology*, 2(1), 44.

A man wearing a green short-sleeved shirt and yellow overalls is working with blue fishing nets in a body of water. He is holding a white bucket and appears to be managing the nets. The background shows a building with a grid-like structure, possibly a greenhouse or a large windowed structure. The scene is outdoors, with some green grass visible in the foreground.

**Thank you for your attention!!!**