

Production of all males tilapia through hybridization



Presenter

Elysée Nzohabonayo
elyseemugomozi@gmail.com

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



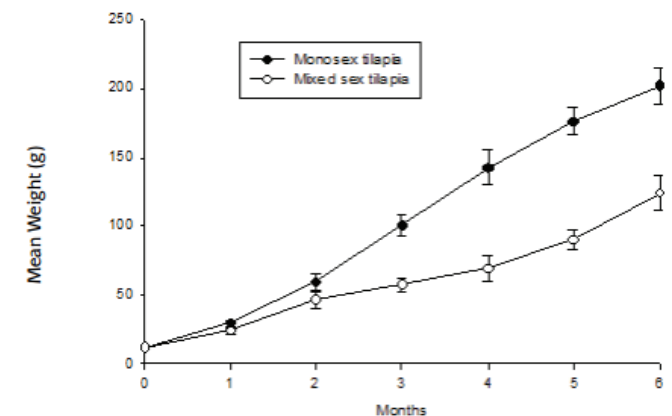
Why all males are concerned?

- 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

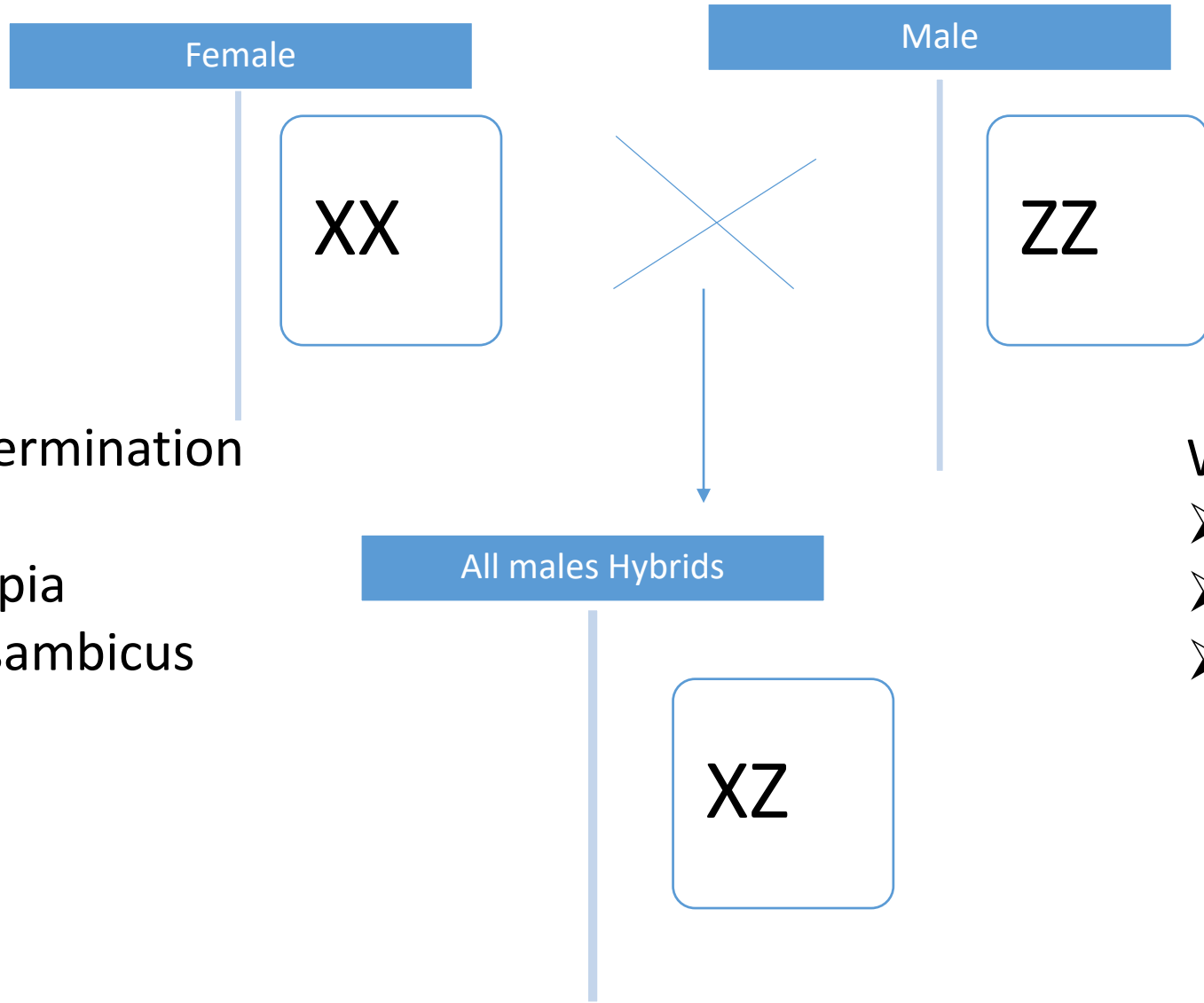


After six months, the average weight of male monosex was 200.8 ± 0.81 g and mixed sex 123.4 ± 0.76 g, respectively (Githukia *et al.*, 2015)



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

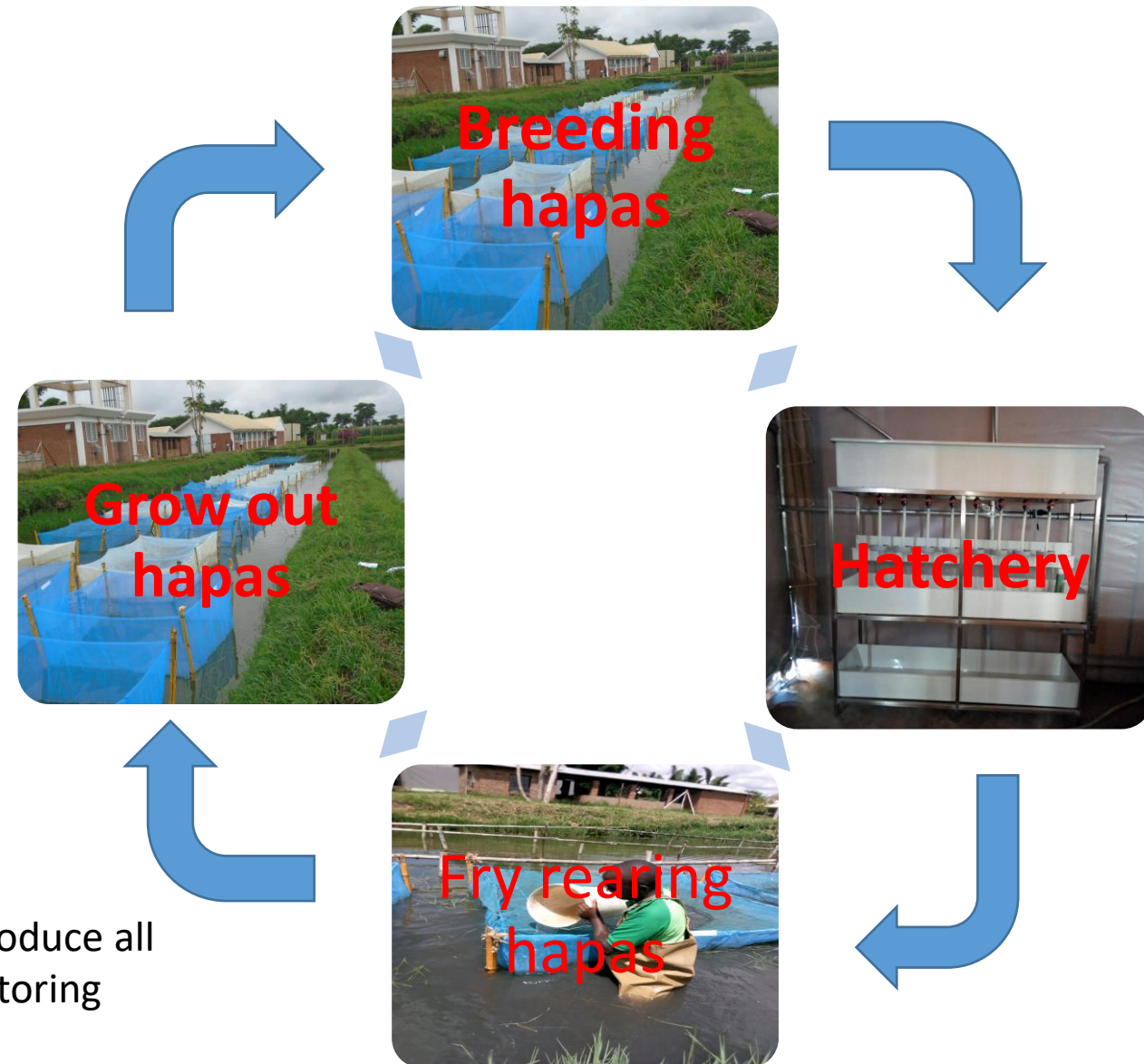
- 1 Collection of brooders: O.Karongae from Lake Malawi and O Shiranus & O mossambicus from shire river**
- 2. Conditioning brooders at the farm: O.Karongae & O Shiranus in pond and O mossambicus in tank**
- 3. Selection criteria were :Size selection, Health of the fish, readiness and sex of the fish**

Set up of the experiment

Female	Male	Offspring
OM	OK	Hybrid
OM	OS	Hybrid
OM	OM	Pure
OS	OK	Hybrid
OS	OS	Pure
OS	OM	Hybrid
OK	OK	Pure
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!!!