Newsletter Til-Aqua International BV

TIL-AQUA
NATURAL MALE TILAPIA
INTERNATIONAL
YY-Technology

Special

Content

Tilapia industry hormone-free? YY-Technology!

Each year large amounts of testosterone are used in the tilapia industry worldwide....

This is a massive quantity of hormones for animal production in a modern society where sustainability, food-safety and environment have top-priority.....

Til-Aqua YY-Technology: ready for today

Modern YY-Technology uses the natural capacities of tilapia and genetic selection to produce All Male tilapia without the use of any hormones: Natural Male Tilapia (NMT™)!

Til-Aqua reaches milestone: Male Ratio 99%

After 12 years of selective breeding we are now ready for the future with our **99% male-ratio** in our Til-Aqua Silver strain (Oreochromis niloticus - Wildtype) with an excellent performance under a wide range of conditions. More easy and more effective!

Testosterone, immune system and high mortality

When a tilapia egg has hatched into a fry, the immune system is not completely developed yet. Only after a few weeks the fish is able to cope with the challenging outside world.

When recently hatched fry are fed with testosterone enriched feed during the first three weeks, the development of the immune system will be strongly decreased. Testosterone has direct negative effect on the immune system and in particular on the mucus (skin-defense); creating free access for parasites, mold and bacteria. This decreased development of the immune system will obviously affect performance in later stages of life.

Haitham G.Abo-Al-Ela e.a., 2017, The extent to which immunity, apoptosis and detoxification gene expression interact with 17 alpha-methyltestosterone

Sayeed and Moneeb, 2015, *Haematological and biochemical characters of monosex tilapia cultivated using methyl-testosterone.*

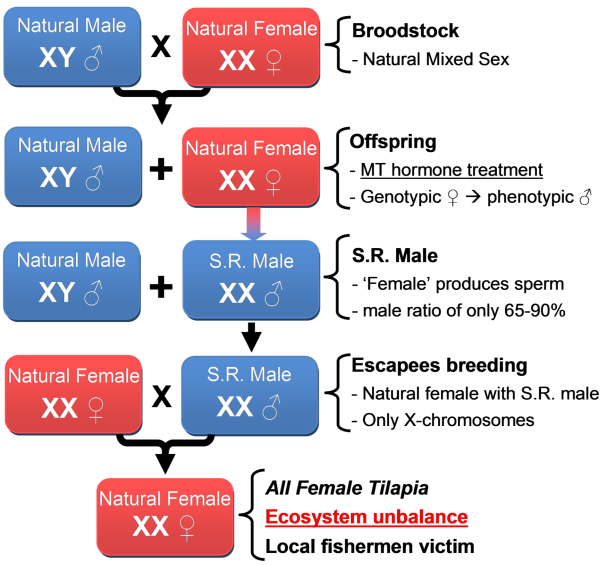
Harris and Bird, 2000, *Modulation of the fish immune system by hormones.*

Testosterone induced sex reversal and the ecosystem disaster

Fish that have been sex reversed by the use of testosterone will act and look like males (phenotypically males), but they still carry the female genetic makeup: XX (genotypically females).

If such a fish escapes into the environment and spawns with natural females this will result in an all female offspring, causing a sex-unbalance in the surrounding ecosystem.

The ecosystem disaster: Escaping S.R. Males



Testosterone induced sex reversal and feed quality

When feeding testosterone enriched feed, a single batch of feed is prepared for the duration of at least 21 days. This feed commonly originates from grinding a feed that is intended for on-growing. However, this type of feed does not meet the requirements of a developing fry, especially since it is often already a poor feed in itself. Next to that, the feed will be very fine (dust) which is far from optimal for a fingerling that is at least three weeks old at the end of the treatment.

To make sure a dust-like feed actually ends up in the pond, is a challenge in itself.

During this critical period of physical development, optimal quality feed is required! That is why at Til-Aqua we are convinced that a bad start cannot be compensated. Even not with high quality, expensise on-growing feed.
Only a good start can result in an optimal finish.

Evangeline E. aravata, Annabelle A. Herrera and Jose S. Abucay, 2004, *Impact of the Quality of First Food on Digestive Enzymes and Development of the Anterior Intestine and Hepatopancreas.*

"Testosterone-induced mono-sex production in Tilapia has severe side effects. These alterations are considered as an indication for performance and health of fish."

According to Sayed and Moneeb, 2015

Testosterone induced sex reversal and human welfare

Commonly, testosterone is administrated to the feed by employees that spray the hormone on the feed, without any protection. Daily, these employees are in contact with testosterone often with lacking procedures to follow, and no regulation or control. There are serious doubts about the effect of testosterone on human physiology; i.e. vital organs, muscles, social behavior and libido.

Meghowon and Mojekwa, 2014, *Testosterone and its effect on Fish, Man and Environment*

Testosterone induced sex reversal and actual costs

At a first glance, hormonal sex-reversal *seems* to be a financially favorable option.

When having a closer look, some cost-increasing aspects should be taken into account. First of all, an increased number of fry will be required. Due to the fry having lower immunity, a relatively high mortality con be expected. Also the poor quality dust-like feed will result in a less robust fish so disease issues will be likely to continue for the whole production process. To still get the required amount of fish, either fry intake or Broodstock numbers should therefor be increased.

Secondly, for various reasons the efficiency of the testosterone treatment through feed is often not optimal. The male ratio in the population will therefor far below 100%. The negative effects can be compared to those of the earlier described mixed sex population.

YY-male and female lines; 1+1=3!

Combining two worlds offers unprecedented possibilities...

We have tested our YY-males with females from different tilapia strains:

Strain	Male Ratio
Til-Aqua Silver	>99%
Manzala (Egypt)	>96%
Manila	>96%
Kenya local strain	>96%
A Gift strain	>98%

Crossing genetically separate lines (no family relationships), causes a so-called *heterozis effect* or *hybrid vigor*: the end-result performs even better than each of the parents.

Til-Aqua can not guarantee above performance for each local strain but results so far are very encouraging! Based on our customers' feedback, we continue to work on improvement!

Oreochromis niloticus L.

Natrual Male Tilapia (NMT™)

Silver NMT™

Male Ratio 99%

Til-Aqua: Since 1994

Til-Aqua has always believed in obtaining a male ratio of 100% with an excellent performance in growth, FCR and uniformity, without the use of hormones. Although we strive for further improvements, during the last 13 years the following has already been achieved:

- Male ratio of 99% (Til-Aqua Silver/Wildtype)
- FCR of 1.18 at 800 gram under average circumstances (aerated pond farm in Abuja, Nigeria with a 35% protein-feed)
- Uniform growth from 5 till 800 grams in 6 months without grading

Mixed sex is not an option.

The use of mixed sex populations is no option for an efficient tilapia production:

- reproduction will decrease performance; especially in pond cultures.
- female growth is significantly slower than male growth.
- Feed Conversion Rate (FCR) for mixed sex is high due to social interaction.

New insights on growth, feeding, and social interactions in tilapia (Oreochromis niloticus). Fauconneau Benoît, Toguyeni Aboubacar, Fostier Alexis, Le Bail P.Y., Boujard T., Baroiller Jean-François. 1997. In : Proceedings of the fourth international symposium on tilapia in aquaculture = [Actes du 4ème congrès international sur tilapia en aquaculture]. Fitzsimmons K. (ed.) s.l.:s.n., pp. 151-168.

Table 2: Growth parameters and feed utilization ratio of monosex male and female and mixed group fed on self-feeders during a 31 days period in tilapia.

Groups	Monosex male	Monosex female	Mixed	
			male	female
Growth				
Initial weight (g)	12.8 ± 0.7	9.4 ± 1.0	12.2 ± 0.4	9.8 ± 0.8
Final weight	70.1 ± 2.1	42.8 ± 1.2	58.4 ± 2.0	40.1 ± 1.0
Volontary Feeding (%)	3.6 ± 0.1	3.9 ± 0.1	4.1 ± 0.1	
Feed Conversion Ratio	**0.98** ± 2.1	**1,13** ± 0.03	**1.22** ± 0.03	
Protein Efficiency Ratio	2.4 ± 0.1	1.9 ± 0.0	1.93 ± 0.4	
Net Protein Utilization (%)	38.7 ± 1.2	31.2 ± 0.9	30.2 ± 1.1	
Net Lipid Utilization (%)	80.5 ± 1.5	62.8 ± 1.5	65.1 ± 3.0	
Net Energy Utilization (%)	48.6 ± 0.9	38.5 ± 0.6	38.8 ± 1.4	

PER: Body Weight Growth (g) / Protein ingested (g), Net Nutrient Utilization (Nutrient deposited / Nutrient Fed %)

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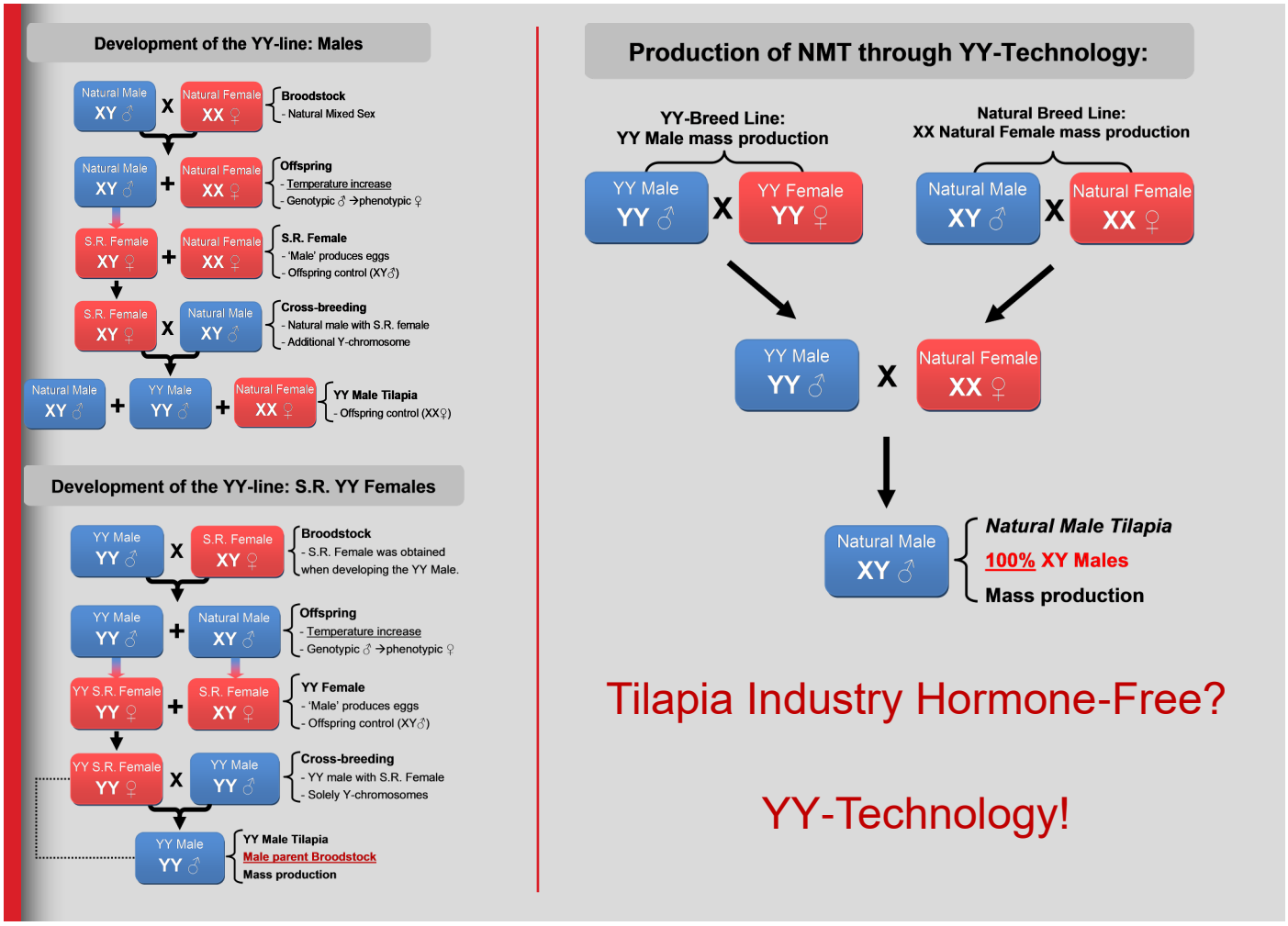

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