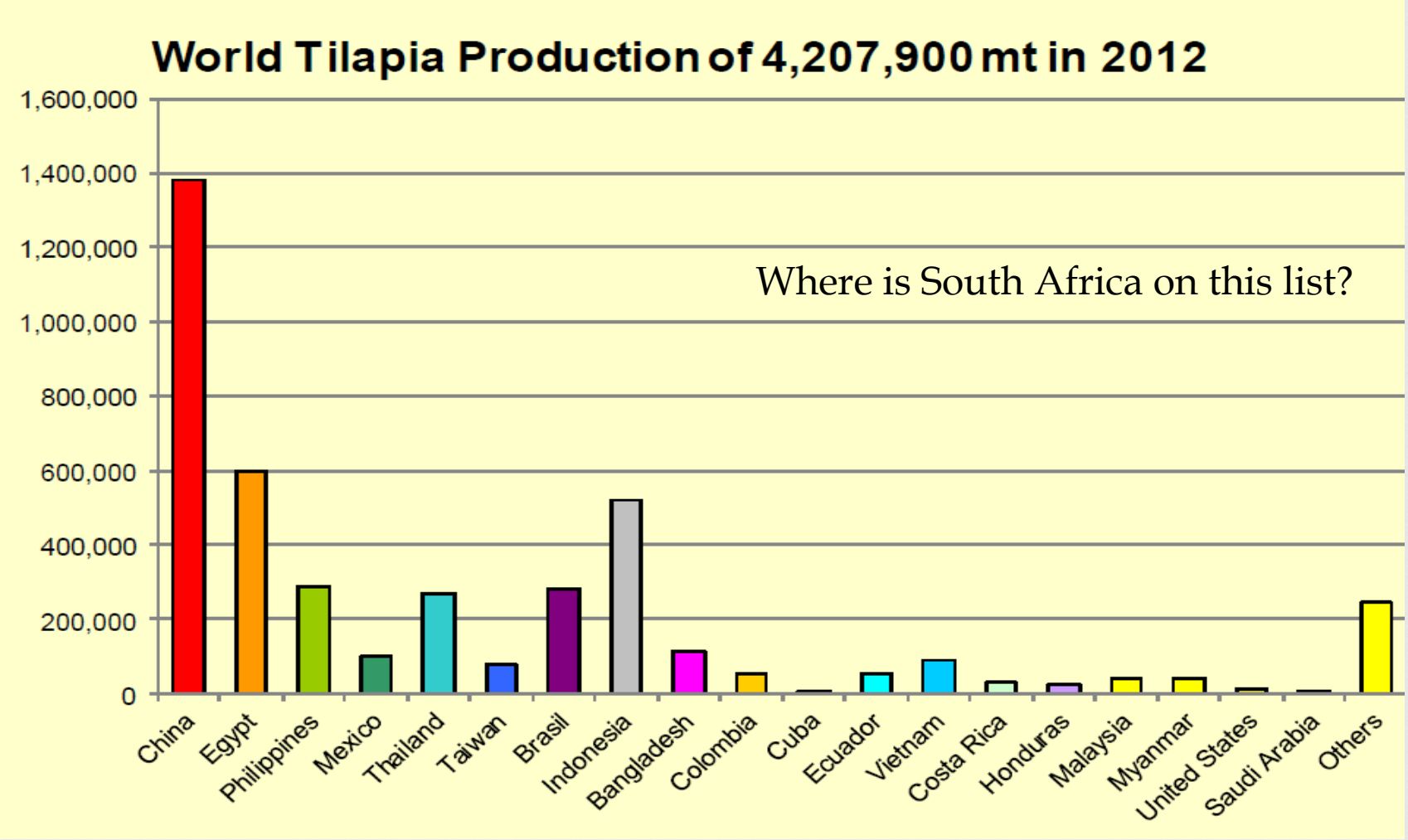
Lecture 3b

Tilapia

Tilapia

- Tilapia are the most widely and successfully farmed freshwater fish in the world
  - In 2012 over 4 million tons of tilapia were farmed
  - Today Tilapia are farmed in every country in the world
    - From Extensive pond culture
    - To Intensive RAS systems
  - Tilapia have become known as "Aquatic Chickens"
    - Long history of culture means the fish is well understood and has become "domesticated"
      - Tilapia adapt very well to culture conditions
      - Tolerate a wide temperature range and low oxygen levels
      - Disease resistant
      - Gift Tilapia

Tilapia production around the world

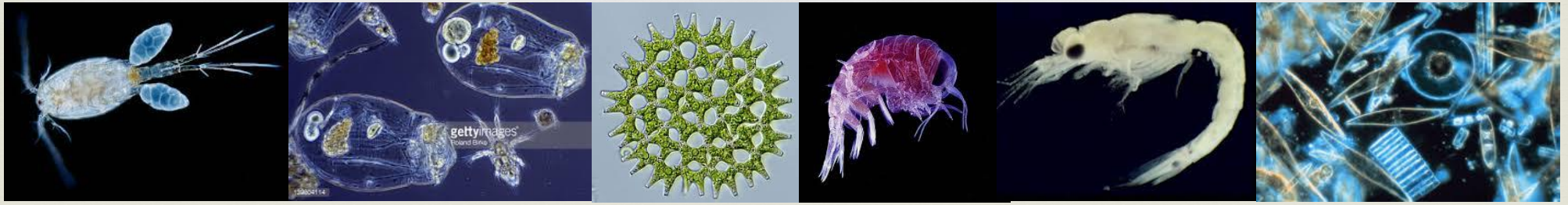


Tilapia

- The best temperature to farm tilapia is 26°C, but they will grow when temperatures go above 18°C and up to 32°C
  - This wide temperature range is one of the reasons tilapia are so popular.
  - However they will not grow if water temperatures drop below 17°C and can not survive temperatures below 12°C

Tilapia

- Tilapia are generalist feeders
  - They will eat a wide range of food
    - Plants and algae's
    - Insects and worms
    - Zooplankton
  - Tilapia readily accept commercial feeds
    - Pelleted tilapia feeds that have been scientifically formulated to meet the nutritional and dietary requirements for tilapia are well developed and easily available



Tilapia

- Reproduction
  - Tilapia breed very easily under captive conditions
    - Once they reach sexual maturity they will breed every few months
  - Tilapia are "mouth brooders"
    - This means they look after their eggs and fry in their mouth.
    - They are very good parents and as a result have very high juvenile survival rates
    - Once the fish are too big to go into their mothers mouth they can easily be caught and moved into nursery or grow out ponds
  - Collecting Eggs
    - For more control the eggs can also be harvested and then hatched in incubators

Tilapia

Tilapia

- The ease of breeding tilapia is one reason many farmers choose tilapia for aquaculture
  - But it is also one of the biggest disadvantages
    - Because they can breed when they are still small it can be very difficult to control when, and which, fish breed
    - Unregulated breeding in tanks leads to large populations of small and unmarketable fish
  - This is considered the main reason many tilapia farms have failed
    - Can this problem be solved?
    - YES!

Tilapia

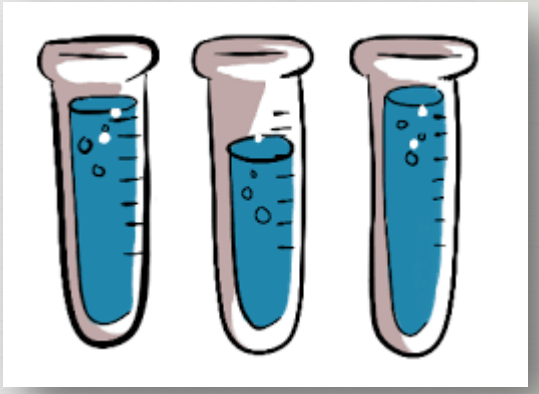
- Today tilapia farmers farm with mono-sex fish cultures
  - They only grow male fish
- This is achieved through a process called sex-reversal
  - As soon as the eggs hatch the young fry are fed a chemical called ***methyl-testosterone*** for 21 days
  - This causes all this fish to become males
    - Because the fish can not breed and there is no competition for females they grow faster
    - The farmer also has more control over how many fish there are in each tank or pond

Tilapia

- Hand sorting can also be used to separate male from female fish.
  - Before stocking the grow-out ponds, keep the fish in the nursery until they are big enough to sex.
  - Make sure you only put male fish in the grow-out ponds.
  - The female fish can be grown separately of even sacrificed.
- All over Africa people eat and enjoy small fish
  - Trying to develop a market for small fish is another option that a farmer could consider?
  - Markets are driven by peoples perceptions and these can be changed.

Tilapia

- Depending on the type of farm and culture conditions will determine how many fish can be farmed or stocked into a pond or tank
  - Oxygen depletion and a build up of ammonia in the water are the two most important factors to consider.
    - The more fish in the pond the more oxygen they will use
    - The same applies to waste which builds up.



Tilapia

- In extensive systems where there is no water exchange or aeration fish can only be stocked at very low densities
  - Max density is approximately 400g/m^2
  - Initial stocking is done at a rate of 60-100g/m^2
  - This means in a pond of 10mx10m roughly 40kg of fish can be produced per year.
- The stocking density can be increased with water exchange and aeration .
  - In intensive fish farms tilapia have been stocked at densities up to 80kg/m^3
  - This means in the same 10mx10m space you could produce 8000kg of fish per year

Tilapia

- Tilapia are usually kept in a nursery until they are about 30g
  - Depending on temperature and diet fingerling can reach 30g in about 2 months
  - Once they have reached 30g they can be stocked into the grow-out ponds or tanks
  - If temperatures are high and feed is readily available the fish can grow as big a 1kg in 6 months, but are typically ready for market at about 600g

Tilapia

- Tilapia are highly sort after food fish and are becoming increasingly popular