

# Aquaponics: Fish Production

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Aquaculture Boot Camp 2

OSU South Center

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# Ideal Attributes for Aquaponics

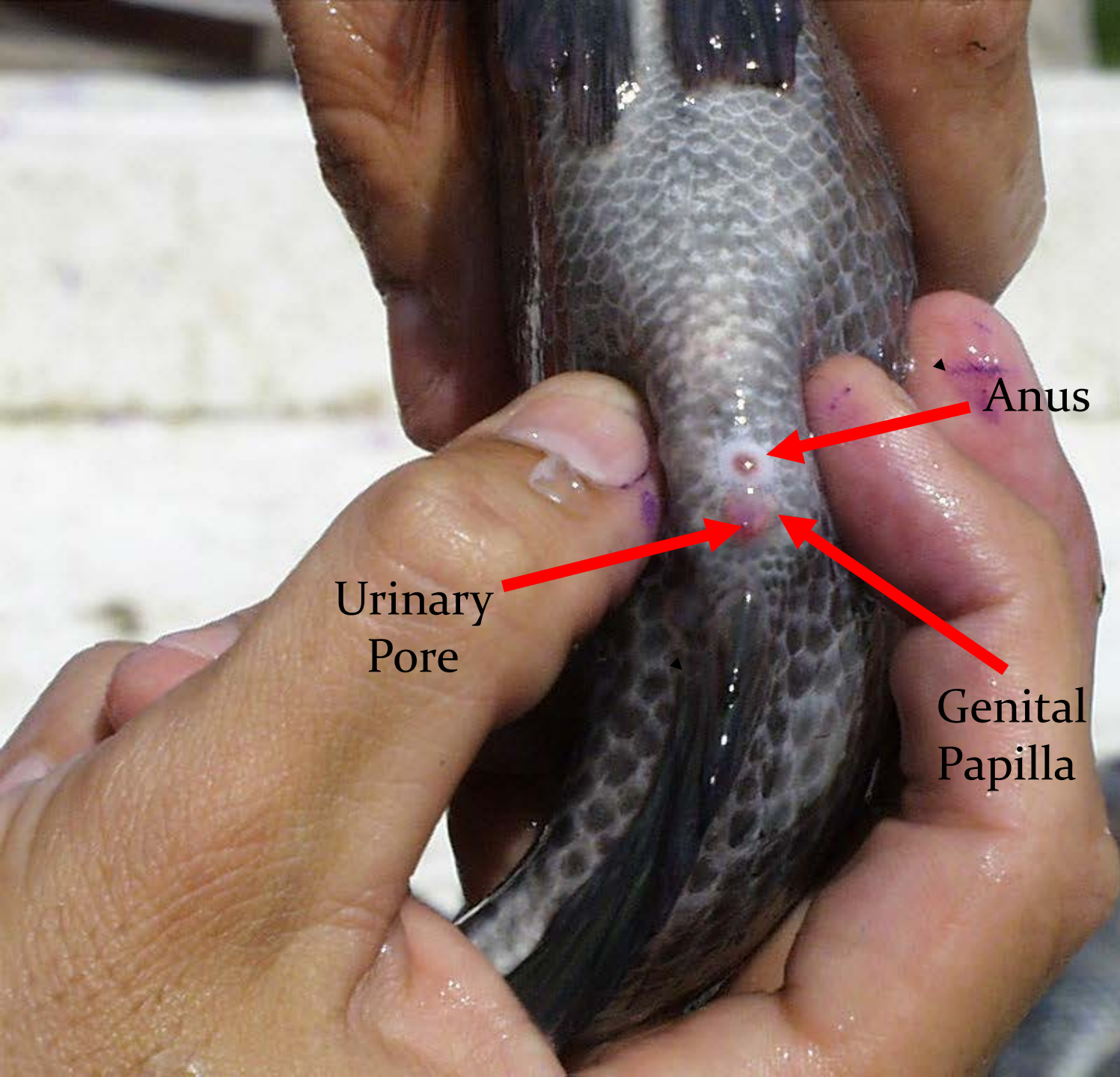
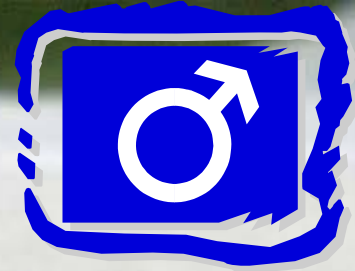
- Ease of culture in RAS
- Easily trained onto commercial diets
- Fast growth
- Tolerant to stress and poor water quality
- Resistant to disease
- Low FCR
- Easily reproduced
- Temperature and oxygen demands similar to plants
- Marketable

# Species Cultured in Aquaponic Systems

- Tilapia
- Trout
- Barramundi
- Murray Cod
- Silver, Golden and Jade Perch
- Koi and Grass Carp
- Bluegill and Bass
- Hybrid Stripped Bass
  
- IS IT LEGAL?



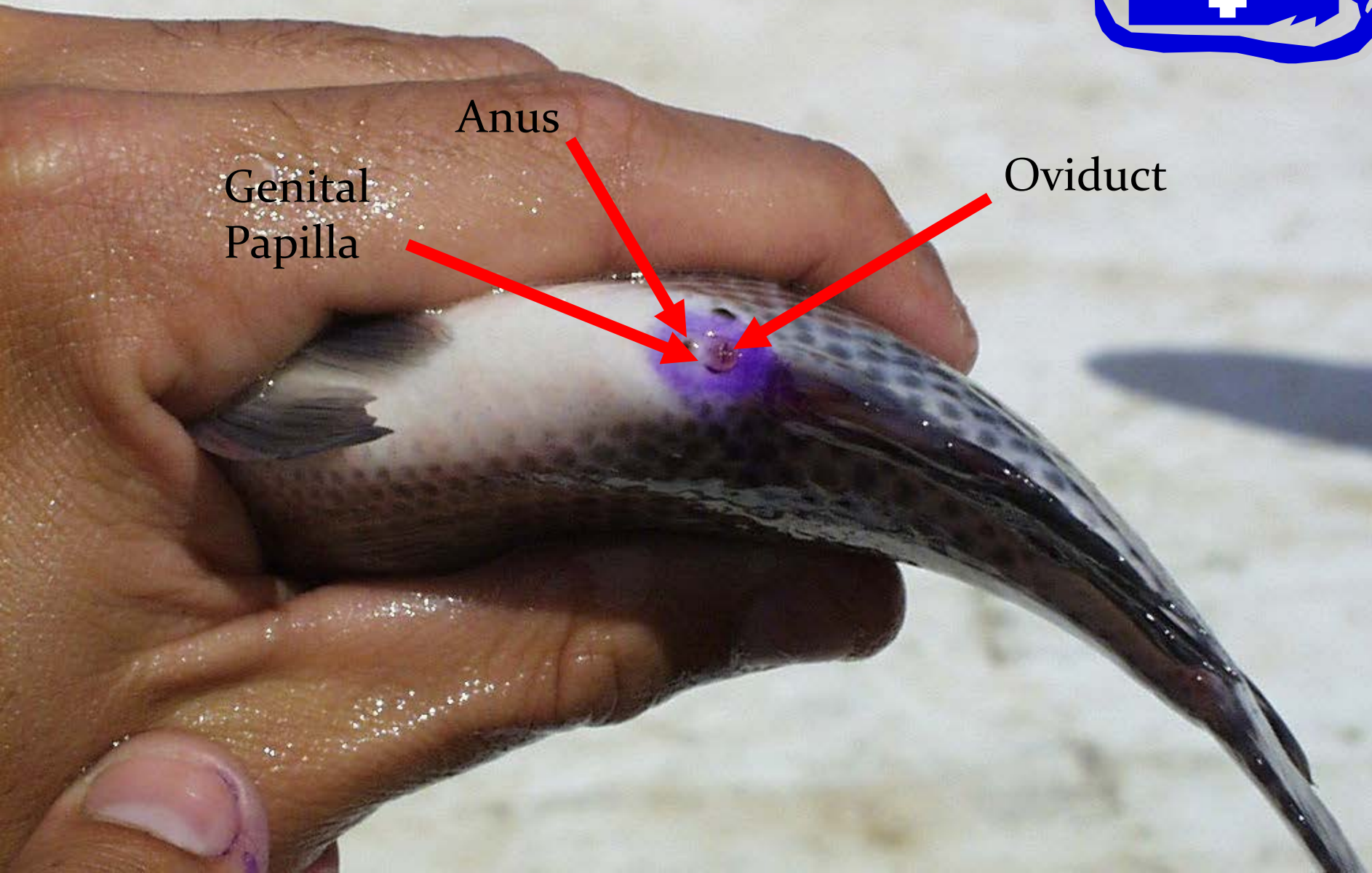
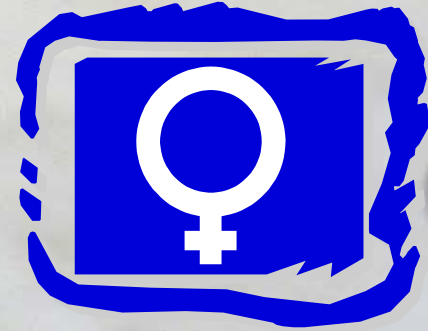




Anus

Urinary  
Pore

Genital  
Papilla



Anus

Genital  
Papilla

Oviduct























# Lethbridge College Nutrient Generators



# Advanced Fingerling - Tilapia

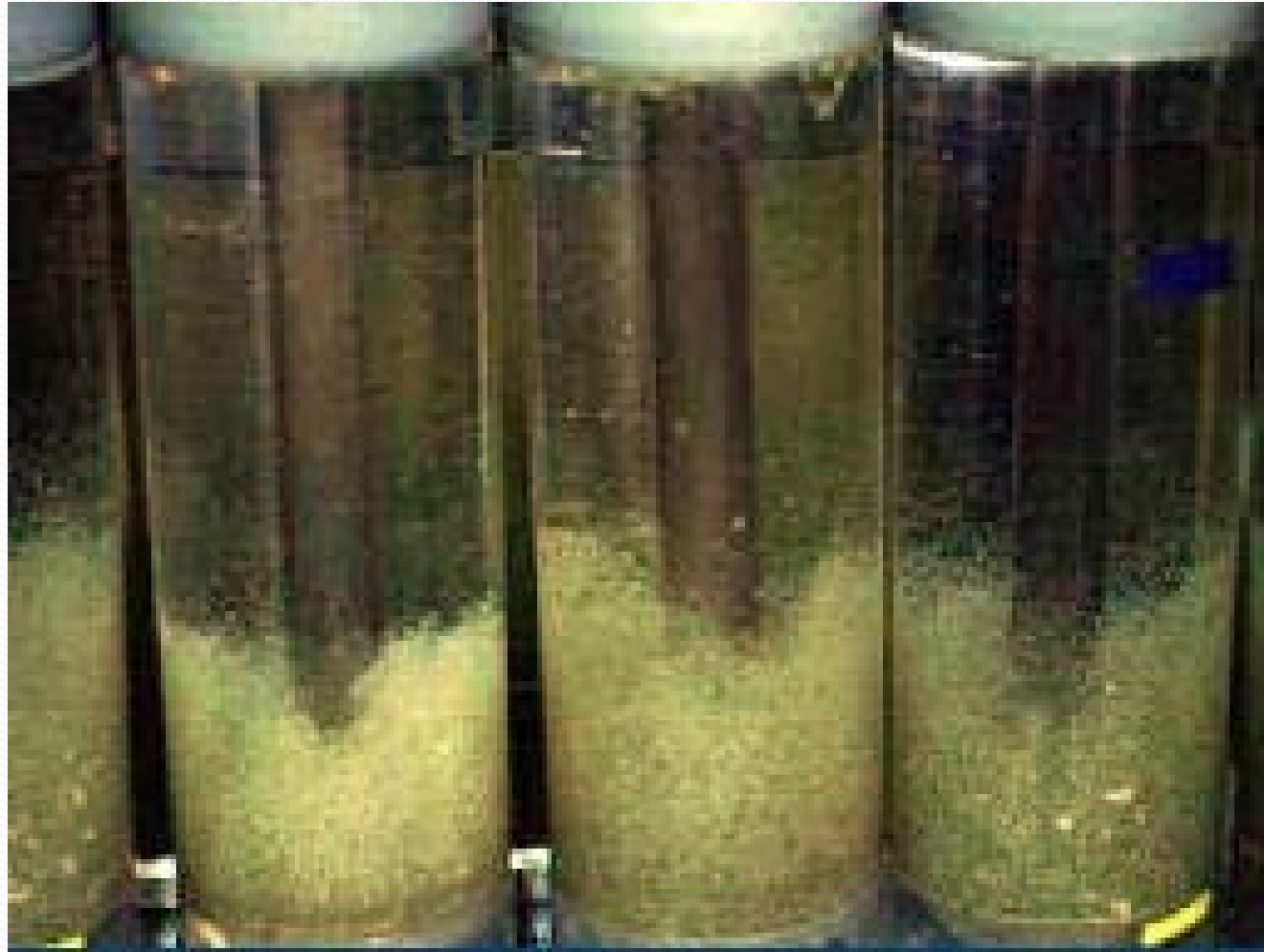


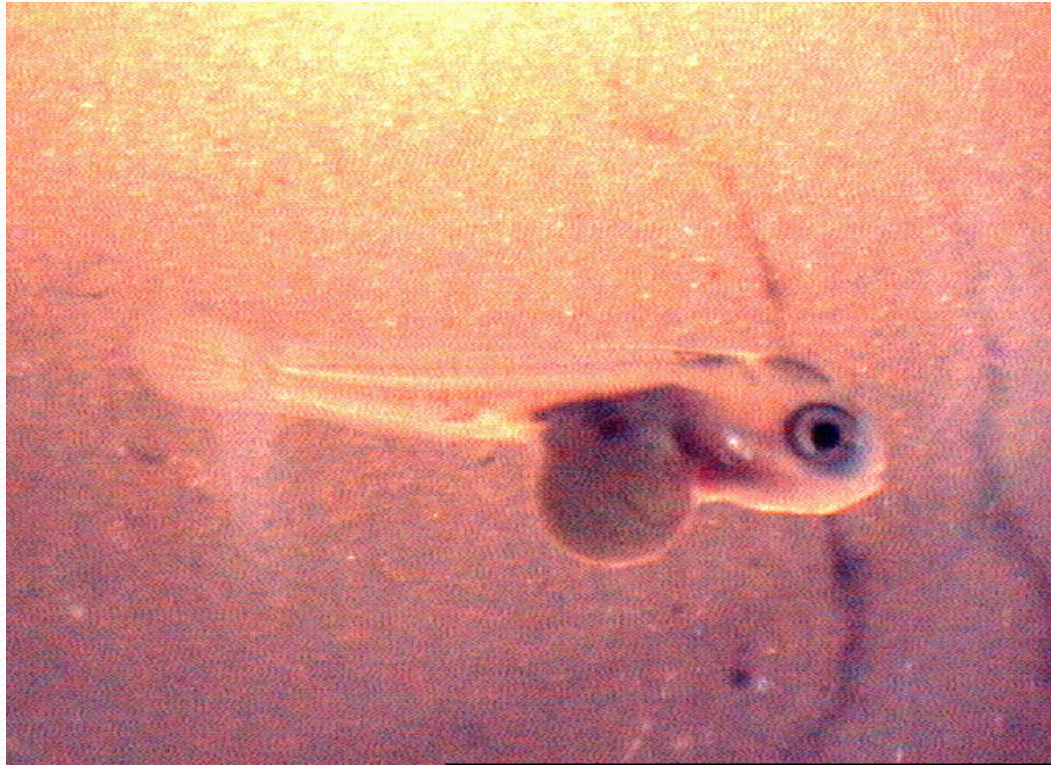
# **Tilapia Spawning Behavior**

- **Male establishes territory in tank**
- **Female approaches, courtship occurs**
- **Female spawns and male fertilizes the eggs**
- **Female picks up eggs into mouth and incubates them for 3-6 days until hatch**
- **Sac-fry continue to be protected by mother for additional 5-days until yolk is absorbed and they eat commercial feed**



















# Counting Fry

- **Counting fry**
  - Visually estimated
  - Too small for accurate weight count
    - First count 400 – 500 per container
    - Compare and visually “guestimate”



# Estimating Fry Number



# Feed Chart

Size	Feed Type	% Body Weight
Yolk absorb to 1.5 g	MT (Powder)	25-15%
1.5 – 5 g	Fry Starter 200 (Powder)	10%
5 – 20 g	Rangen Extra 450 (1/16")	6%
20 - 50 g	5DO8 (3/32")	3%
50 – 700 g	5DO7 (1/4")	3-1%

# Typical Protein Requirements for Tilapia

<b>First feeding fry</b>	<b>45 – 50%</b>
<b>0.02 – 2.0 g</b>	<b>40%</b>
<b>2.0 – 35.0 g</b>	<b>35%</b>
<b>35.0 g - Harvest</b>	<b>30 – 32%</b>

- **Sinking**
  - Must be fed slower
  - Hard to observe fish
- **Floating**
  - Has air pockets
  - Easier to observe fish



# Types of fish pellets





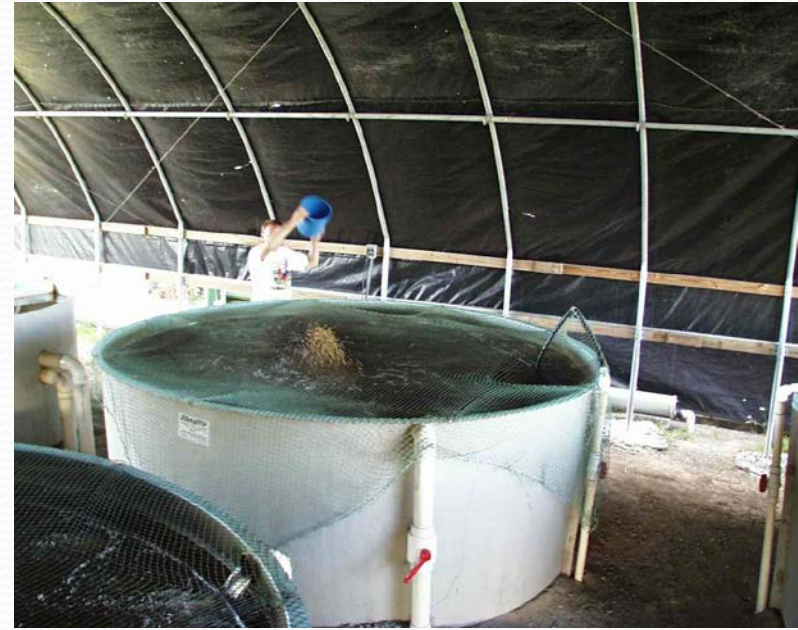


# Feeding Strategies

- **Ad libitum or Satiation:**
  - Feed all fish will eat during timed period
    - 2 - 4x/day
  - Farmer understands his/her “fish personalities”
- **Percent Body Weight/Day**
  - Based on growth rate, FCR, and survival
  - Requires frequent sampling
    - Divide daily ration; fed 2 - 4x/day

# Feed Presentation

- **Hand feeding**
  - **Advantages**
    - Fish observation
      - Healthy, vigorous feeding
  - **Disadvantage**
    - Labor intensive
- **Demand feeder**
  - **Advantages**
    - ad libitum, less labor
  - **Disadvantages**
    - Nature, higher FCR, bullies, breakdowns, capital costs





# Feed Storage

- **Inadequate storage leads to nutrient loss**
  - Sunlight = vitamins
  - Heat = rancid fats
  - Damp = molds
- **Cool, dry place**
  - Air-conditioned room
  - Use before expiration date (3 months)
  - Don't stack higher than 10 on pallet
  - First in, first out strategy
- **Rodent resistant**
  - Eat and defecate on food



# Feed Fish Properly

- **Water quality controlled**
- **High growth and low FCR**
- **Uniform**
  - **Bullies/runts**
  - **Dress-out**
- **Nutrition-linked diseases eliminated**
  - **Scoliosis, cataracts, fat deposits, etc.**

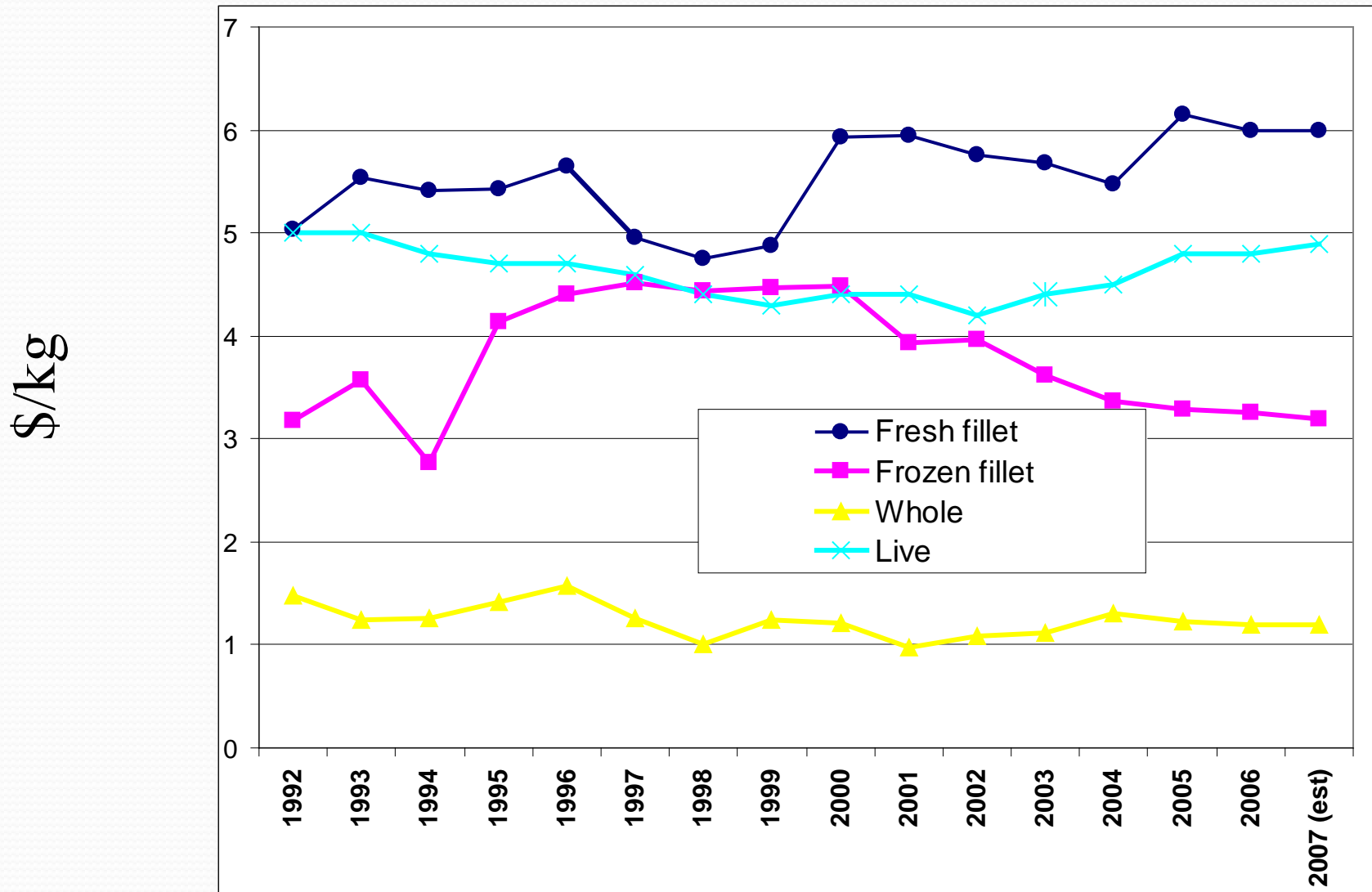
# Feed Fish Improperly



- **Poor water quality**
  - Ammonia, nitrite, pH, oxygen
- **Slow growth and high FCR**
- **Nutrition-linked diseases prevalent**
- **Less uniformity**
  - Size variation
  - Dress-out percentage low

# Global Tilapia Market Trends

Prices have been constant, only fresh fillets have increased slightly, will not see increases with inflation



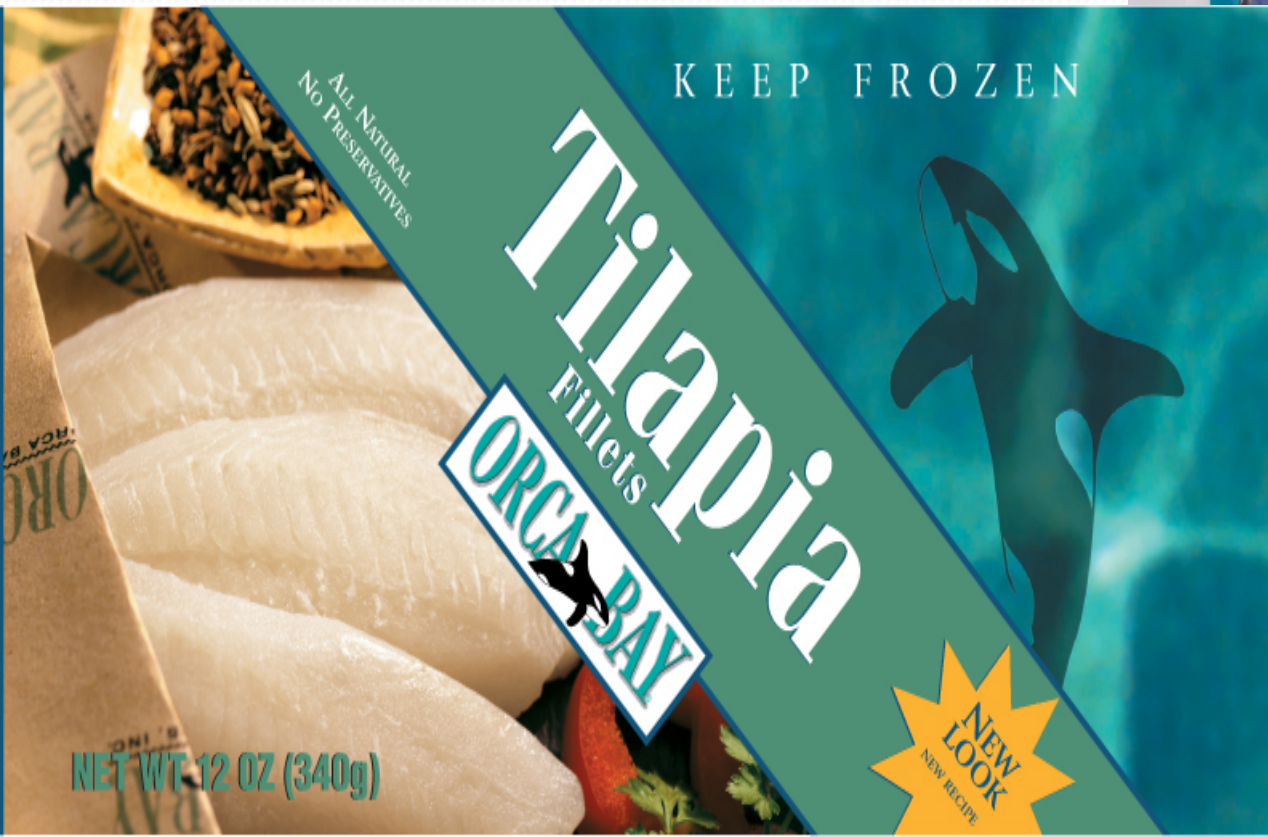


# Improvements in packaging





# IQF Fillets in re-sealable packages













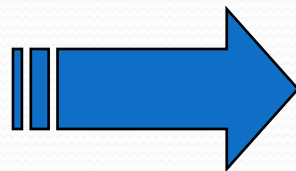








# Tilapia Leather





Tilapia Skin Bikini

# Other Fishy Concerns

- Alternative Feed Ingredients/GMOs
- Disease Prevention/Identification/Treatment
- Selling/Processing Fish
- Vendors
- GET TO KNOW YOUR EXTENSION AGENTS!





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