ABC Bootcamp

Elements of Aquatic Animal Health

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Elements

- Whole function of this section is to
  - Know what fish health is
  - Link the importance of fish health with production success
  - Identify what those **basic** elements of fish health are

  - Then the rest of the day is learning more about them…

Elements

- How to tell if your fish is sick
  - Clinical signs
  - Possible causes

- We'll talk about a combination of-
  - Public Aquaria
  - Aquaculture
  - Pets
  - Wildlife

Aquatic Animal Health

Defining our Critters

- Aquatic Animals are
  - Any life stage (gamete, eggs, fry, adult) of
  - Fish, molluscs, crustaceans, or amphibians (& reptiles)
  - Taken from the wild or produced in captivity
  - For farming, release, human consumption or ornamental display

- Aquatic Animal Health (Medicine)
  - Is the condition and treatment of (any of the above) aquatic animals to control and prevent diseases.

Aquatic Animal Health

Why generalize?

- Wet herd health
- Done at the population level
  - Economically not viable for individuals (pets and aquaria)
  - One affected, all affected
- With accurate diagnoses, treatments are very successful
- However, the best treatment whether single pet or 10ac pond is-
  - Prevention!

Aquatic Animal Health

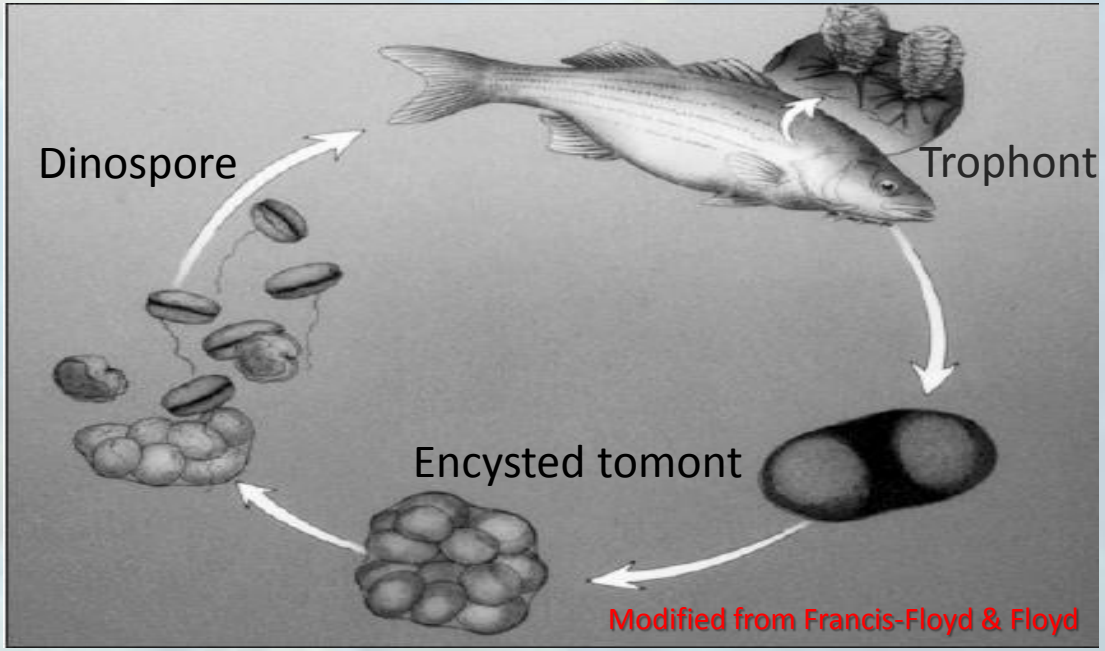
Why does it matter?

- No longer a subsistence enterprise- global
- Wild harvest ⬇
- Aquaculture produced ⬆
- Demand is high, therefore
  - Need to streamline and be efficient
  - Need to be competitive (lots of people trying)
  - Need to be high quality…

Aquatic Animal Health

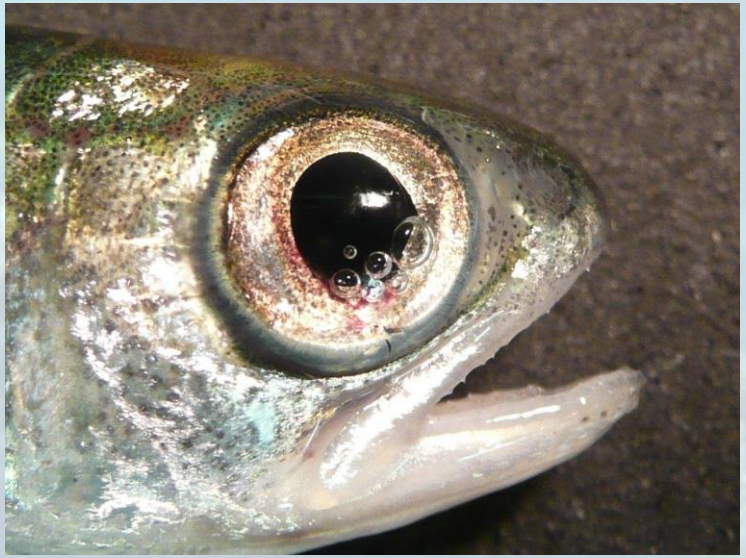
Types of Fish Diseases

- *Infectious diseases*
  - *Parasitic*
  - *Bacterial*
  - *Viral*
  - *Fungal*
- *Non-infectious diseases*
  - *Environmental*
  - *Nutritional*
  - *Genetic*



Common Presentations

- Dead
- Excess mucous
- Bloated/floating
- Raised scales/ dropsy
- Lesions/erythema
- Gas bubbles
- Fluffy/ wormy



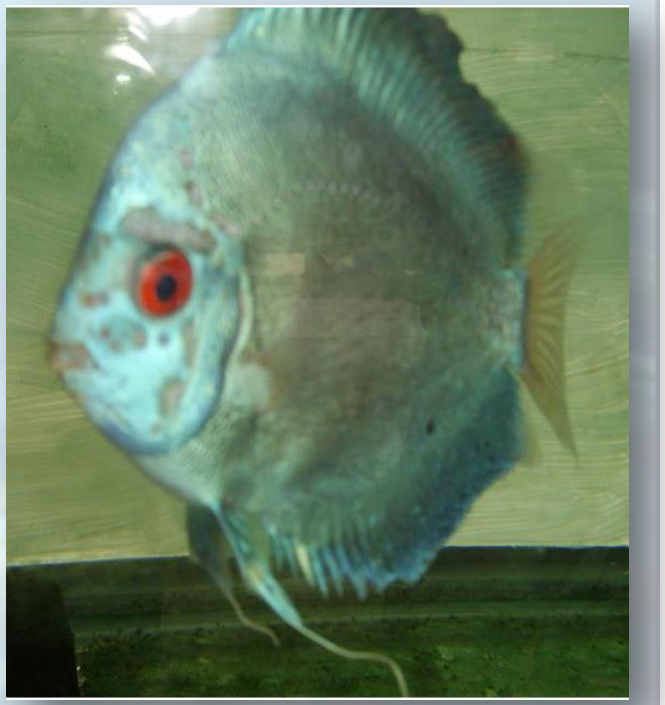
Initial (on-farm) diagnostics

- Distance exam- tank observation
- Water quality
- SFG
- RTT
- Environment- tank screens and swabs
- Review husbandry

Distance Exam

Common Behaviors

- Dead
- Floating
- Piping
- Spinning
- Darting
- Lethargic



Water

- Three most important things in aquatic animal health?
  - Water, water, water…
  - Ammonia, DO, pH, hardness, CO2, alkalinity, temperature, nitrates, organic load
  - Influenced by filtration and water movement

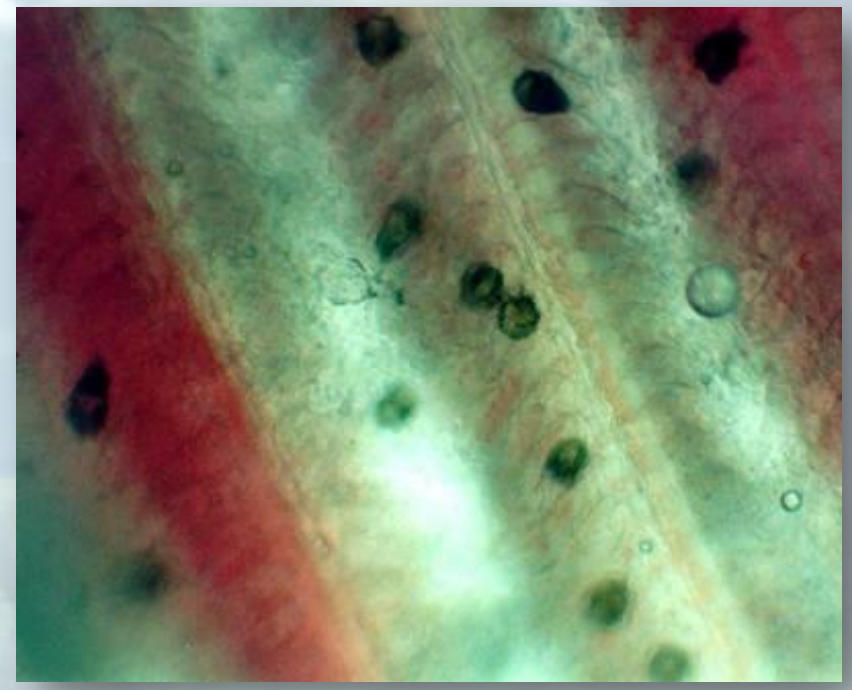
Recommended Reef Aquarium Water Parameters

Temperature	76 to 78 degrees Fahrenheit
Specific Gravity	1.023 to 1.025
pH	8.2 to 8.4
Ammonia	0 ppm
Nitrite	0 ppm
Nitrate	< 10 ppm
Alkalinity	8 and 13 dKH
Calcium	400 and 450 ppm
Magnesium	1200 and 1320 ppm
Phosphate	0 ppm
Iodine	0.5 to 0.8 ppm
Iron	0.1 to 0.3 ppm

SFG

Parasites and Oxygen

- Skin, Fin and Gills
- Invasive procedure but very revealing
- Samples of each to look for parasites
- Gills also show potential gas issues



RTT

It got better…

- Response to Therapy
  - Tried treating to see if improved
- Usually based on a presumptive diagnosis
- More usually based on what happened last time
- Risks are
  - Expensive to treat tanks without a definitive diagnosis
  - Each time you add a drug to the water you risk a/b resistance & saleability

Environment

Tanks and screens

- Filtration systems
  - Expensive to run so go for minimum
  - Often not made for specific set-up or species
- Can use tank to help diagnose
  - Water quality (again…)
  - Screens on filters for eggs/ other critters
  - What else is alive in the tank

Lab diagnostics

- Essential resource- available here!
- Necropsy of tank mates- sick
  - Minimum of 4
  - Gross examination
  - Sterile micro- liver, kidneys, heart, brain, spleen
  - Squish prep (wet prep) of gut and all organs
- Blood collection
- PCR- viral screens

Husbandry

- Not just water quality…

Husbandry

Maximizing Pathogens

- **Organics within:**
  - High stocking densities of fish
  - Excessive biofilm & sediments
  - Dead animals & uneaten foods
- **Organics without:**
  - Anything with a pocket of moisture!
  - Food, floor, wall, ceiling, aerosols (mist/splash), equipment, other animals
- **All favor pathogen survival & transmission**

Husbandry

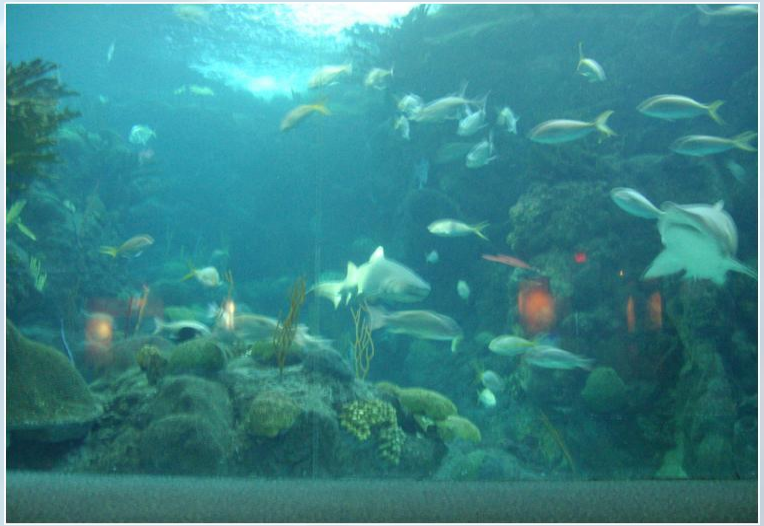
Minimizing Pathogens

- **Reservoirs:**
  - Not just the fish in the tank
  - Non-living:
    - Water, system components
    - Equipment, floors, walls
    - Feed (commercial)
  - Living:
    - Fish
    - Other animals (birds, frogs, insects [int host]) & plants
    - Feed (live & frozen)

Husbandry

People Management

- **Develop a written Biosecurity Program**
  - Q-plans
- **Risk analysis**
  - Risk assessment
    - determine the risk
  - Risk management
    - prevention plan developed & implemented
  - Risk communication
    - *all* people are educated, buy-in & cooperate



Prevention

Biosecurity Goals

- **Animal & population management:** obtaining healthy stocks and optimizing their health and immunity through good husbandry
- **Pathogen management:** prevention of entry, reduction or elimination of potential pathogens (parasites, bacteria, viruses and fungi) to the system
- **People management:** educating and managing staff and visitors on facility biosecurity. Yanong 2011

Prevention

Healthy Animals

- **Know your source (what comes in…):**
  - Problems with each source
  - Wild caught
    - Unknown history/ uncontrolled environment
  - Donations
    - “Hobbyist” issues
  - Breeders
    - Previous problems
    - Specific Pathogen Free (SPF) status

Prevention

Immune Status

- **Influenced by:**
  - Genetics
    - Resistant strains
  - Husbandry
    - Enviro stressors ↓ immunity
    - Handling ↓ immunity
    - Water quality
    - Nutrition

Prevention

Quarantine

- ~30d clearance period (important)
- All-in-all-out approach
- Pop^{n} isolated, acclimated, observed & treated
- Isolation = physical removal from other:
  - Animals
  - System waters
  - Discharges and splashes
- Sampling & Tx: eg SFG/ bloods/ C&S

Veterans Day

Thank-you to all who served

The End!