Introduction to Aquatic Animal Health

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The Plan:

3 Lectures, with homework...

1. Introduction to Fish Health Management
   ➢ Include Quarantine and Biosecurity

2. Water Quality and Non-Infectious Diseases
   ➢ Nitrogen Cycle, Dissolved Gases

3. Infectious Diseases and Treatments
   ➢ Common diseases and treatments
   ➢ Regulatory concerns
Introduction to Fish Health Management

Developing a Fish Health Management Program:

1. Water Quality/ Life Support
2. Nutrition
3. Sanitation
4. Quarantine/ Biosecurity
What is Disease?

A condition regarded as harmful or abnormal
A pathological condition
✓ Can be pathology of an organ, a system or the entire organism
✓ Characterized by an identifiable group of signs or symptoms

Deviation or departure from NORMAL

Dis - Ease
Is This Fish Sick?
Describe what you see

When in doubt, compare to another animal!
Fundamental Categories of Disease

- Infectious
- Parasitic
- Bacterial
- Fungal
- Viral

Most of these can be internal or external. Multiples common.
Fundamental Categories of Disease

- **Non-infectious**
  - Environmental
  - Water quality
  - Toxin
  - Nutritional
  - Genetic
  - Traumatic
  - Neoplastic

**Pharyngeal Mass in a Koi**

**Sublethal Chlorine Exposure (Largemouth Bass)**
First things first!
A narrow set of conditions lead to disease
Disease Prevention, Detection and Management

Disease Prevention
➢ Maintain healthy stocks (clean, healthy conditions)
➢ Avoid introduction of infectious agents (Quarantine)
➢ Prevent spread of infectious agents (Biosecurity)

Disease Detection
➢ Recognize signs of illness
➢ Collect appropriate samples
➢ Diagnostic Lab support

Disease Management
➢ Based on accurate diagnosis
➢ Appropriate treatment
➢ Support animals while they recover
Quarantine Program Goal

“Ensure healthy, well-adapted animals Are placed into established populations.”

Whitaker, 1999
The Big Goals...

Health Management  
Disease Prevention

Protect Existing Collections
• Avoid bringing new disease in  
• Minimize costly treatments in large exhibits

Allow New Fish to Acclimate  
• New water  
• New foods  
• New Situation
Components of a Quarantine Program
(Primary reference: Whitaker, 1999)

- Animal Records
- Quarantine Procedures
- Environmental Considerations
- Nutritional Concerns
- Vaccination Protocols
- Sanitation Practices
- Methods of Disease Surveillance

Off-Site Quarantine Facility

Quarantine Exam of Atlantic Stingray
Managing Quarantine

Duration
- 30 day minimum pretty universal
- Days 7-21 often most critical
- Longer duration for cool water species
- May adjust if specific concern
- If interrupted, start over!

Social concerns
- Minimize interspecific aggression
- Provide cover (pvc pipe ideal)

Lighting
- Dim lighting first 24 h if possible
- Red lights can illuminate work area
- Use timer so some dark time
- Change intensity gradually

Minimize noise
- Muffle pumps, chillers, filters
- Minimize traffic/activity
Principles of Biosecurity

**Prevent introduction of new Agents**
- Exclude pathogens (use of barriers) from existing stock
- Identify (use of diagnostics) while fish are in quarantine
- Eliminate (use of treatments) while fish are in quarantine

**Manage agents already present**
- Decrease spread (use of barriers and physical separation)
- Decrease numbers (use of treatments and sanitation)
- Increase resistance of resident population
  - Proper environmental and nutritional management
  - Use of vaccination
Every Aquaculture Operation should have a Biosecurity Plan!!!
Biosecurity: Use of Barriers

External Barriers:
- Prevent pathogen spread on or off property
- Examples:
  - Tire/ Truck wash
  - Foot bath
  - Physical separation
  - Restrict access
Biosecurity: Use of Barriers

Internal Barriers:
- Partitioning (isolation units)
- Sanitation/ Hygiene
  - Clean and Disinfect equipment
  - Inactivate Pathogens
  - Prevent fish-to-fish transmission
Use of Disinfectants

- **Chlorine**
  - Good all purpose
  - Inactivated by organic matter
  - Highly toxic to fish
  - Destroys nets

- **Virkon-Aquatic**
- **Quaternary Ammonium Compounds** (Ie Roccal-D)
- **Iodine-Containing Compounds**
- **Chlorhexadine**

*Remember that pre-cleaning to remove organics will enhance efficacy of most products!*
What could be a natural and "free" disinfectant?
What to do if a Disease Outbreak Happens?

1. Recognize that there is a problem
2. Report to supervisor (if appropriate)
3. Take Action!!
Discussion:

What signs might indicate a disease outbreak is starting?
What Action Should You Take?

✓ Collect a sick animal for exam
✓ Test the water
✓ Determine if other areas are affected
✓ Conduct appropriate exam on site
✓ Consider sample submission to a diagnostic lab
What type of sample should go to the lab?

Best.... Live but very sick fish

Worst.... Dead, rotten or floating fish
Summary

➢ Disease Prevention is Important for Aquaculture Businesses to Succeed
➢ Diseases can be Infectious or Non-infectious
➢ Quarantine prevents the introduction of new pathogens to a farm
➢ A biosecurity plan prevents the introduction and spread of pathogens on a farm
➢ Barriers can be used to restrict access, prevent sharing of equipment
➢ Disinfectants can be chemical or natural (drying in the sun)
➢ When disease happens, get appropriate samples to a lab
   (Note that dead rotten fish are NOT appropriate samples!)