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

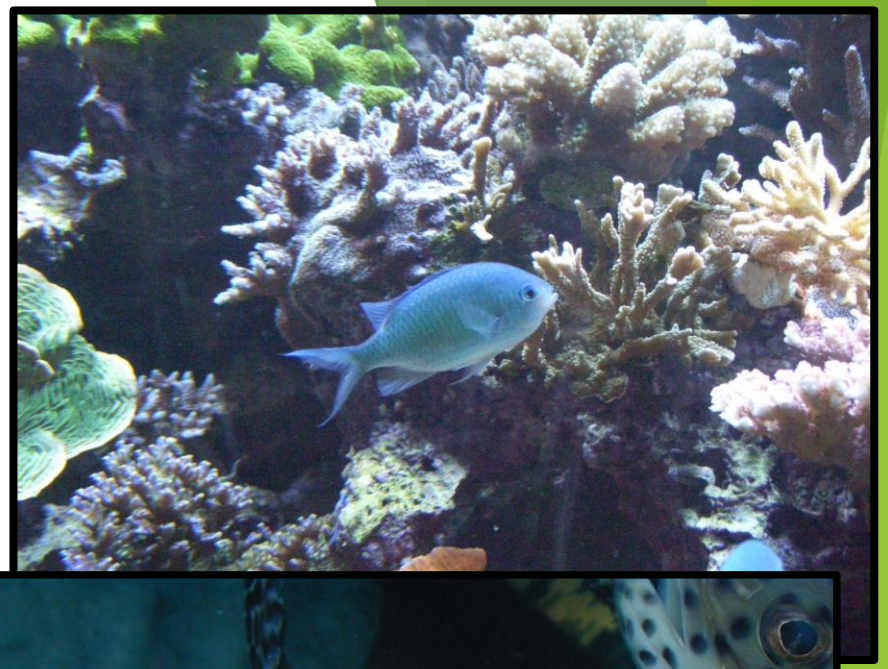
3. Infectious Diseases and Treatments
   - Common diseases and treatments
   - Regulatory concerns

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

Cloudiness along back

Are scales missing?
Is there excess mucus?
Are there open sores?

Big eyes?

Is this normal for this species?

What about the fins?
Body condition?

When in doubt, compare to another animal!

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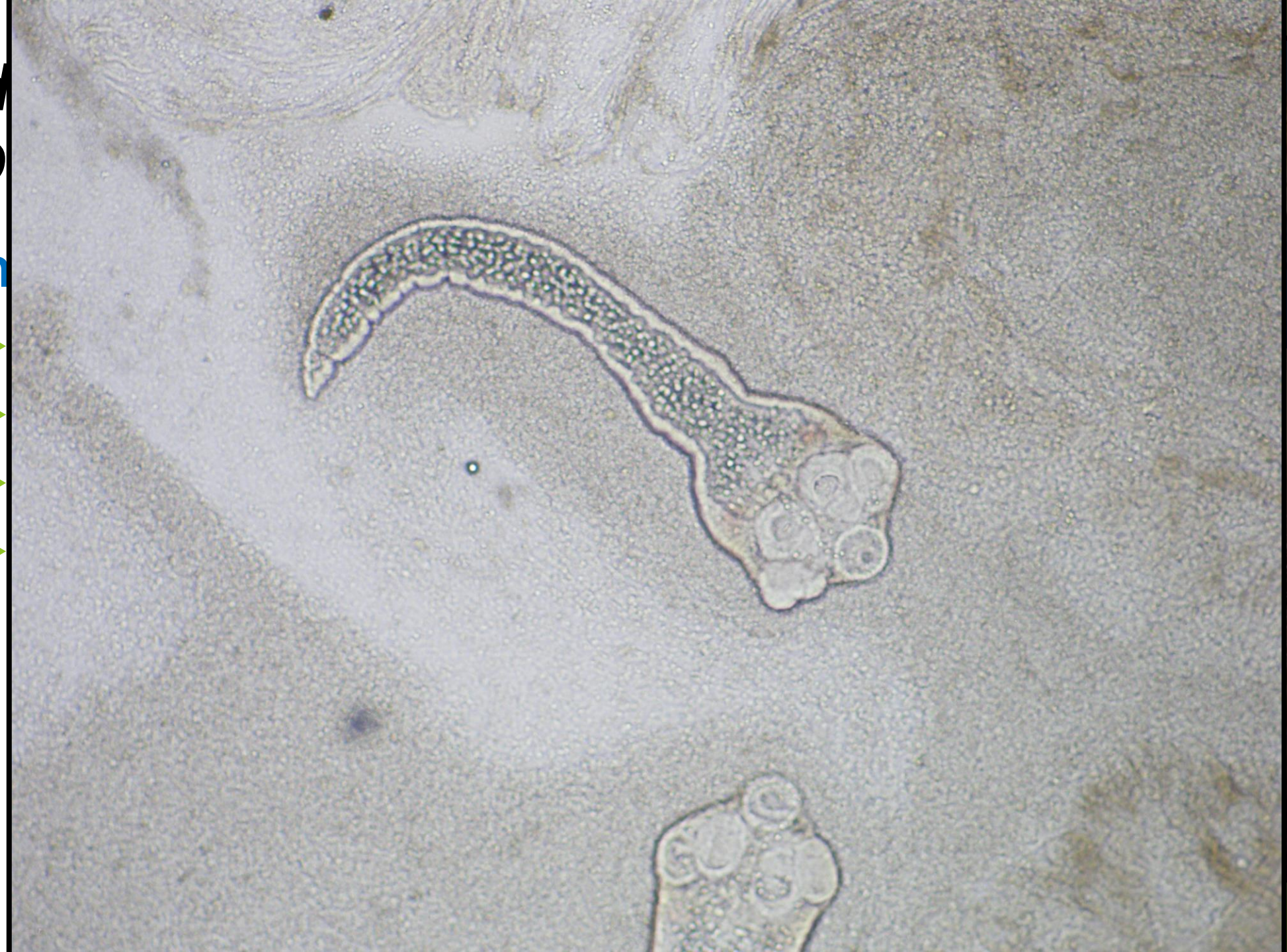
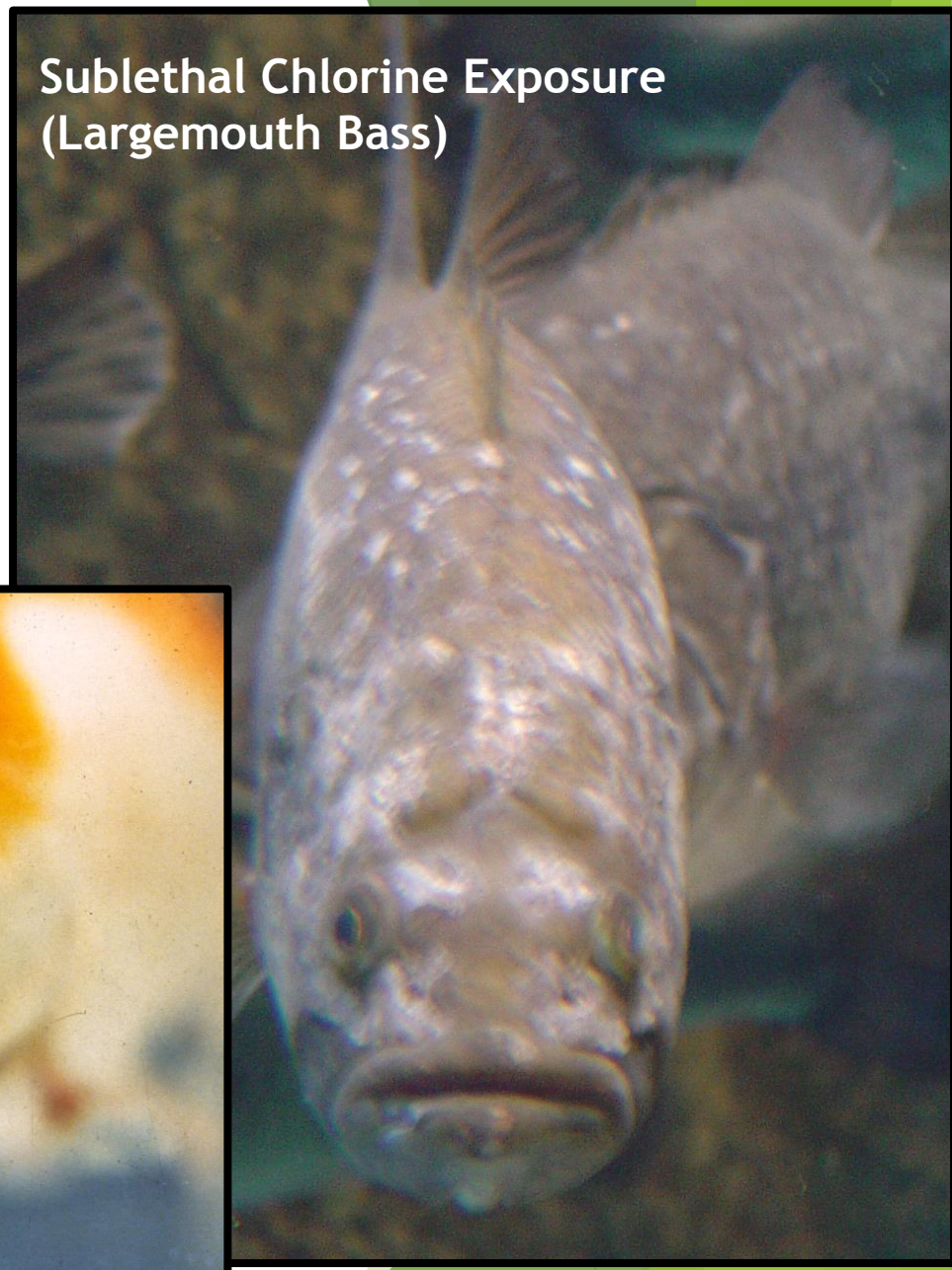
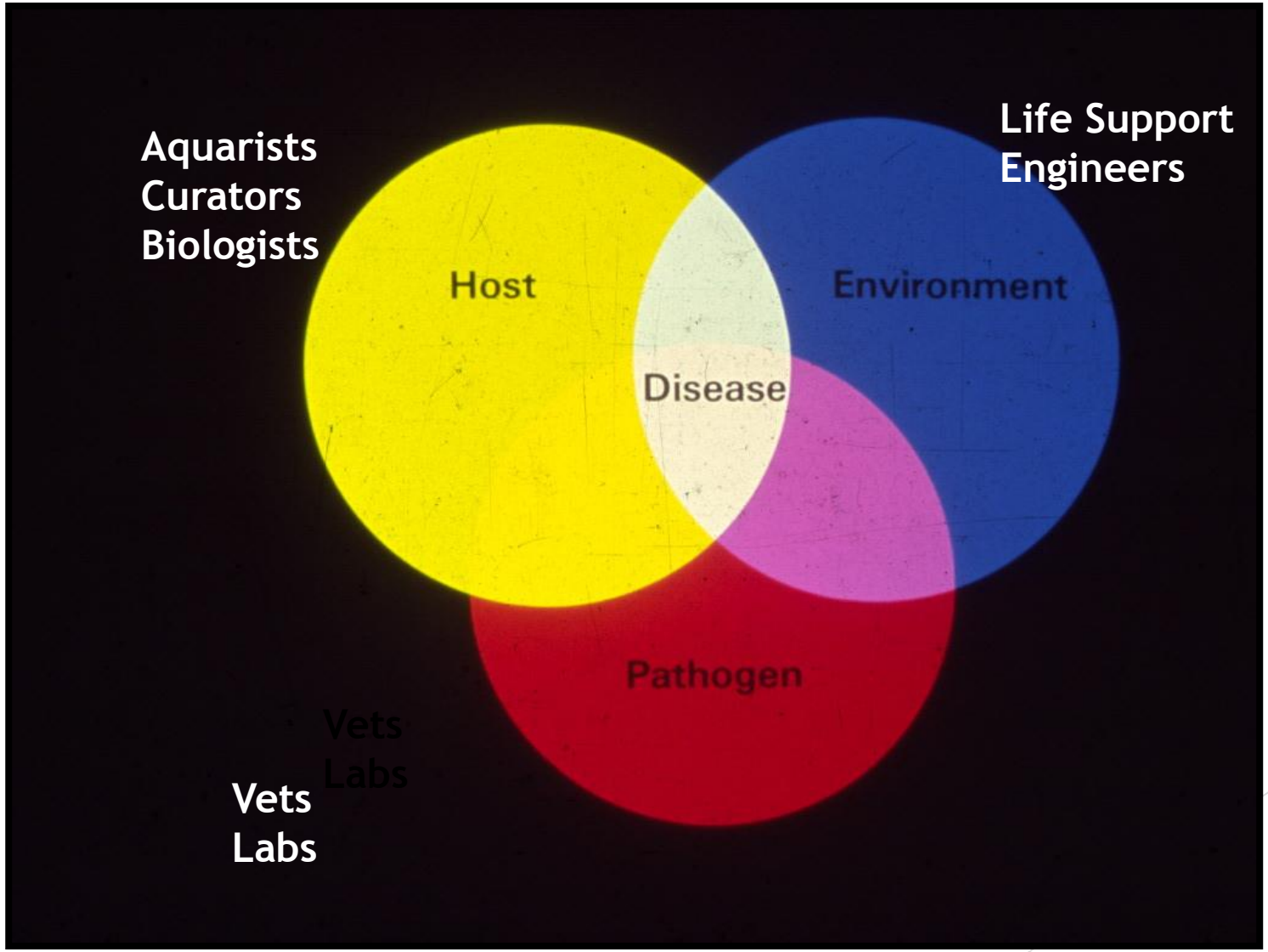


Fundamental Categories of Disease

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



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

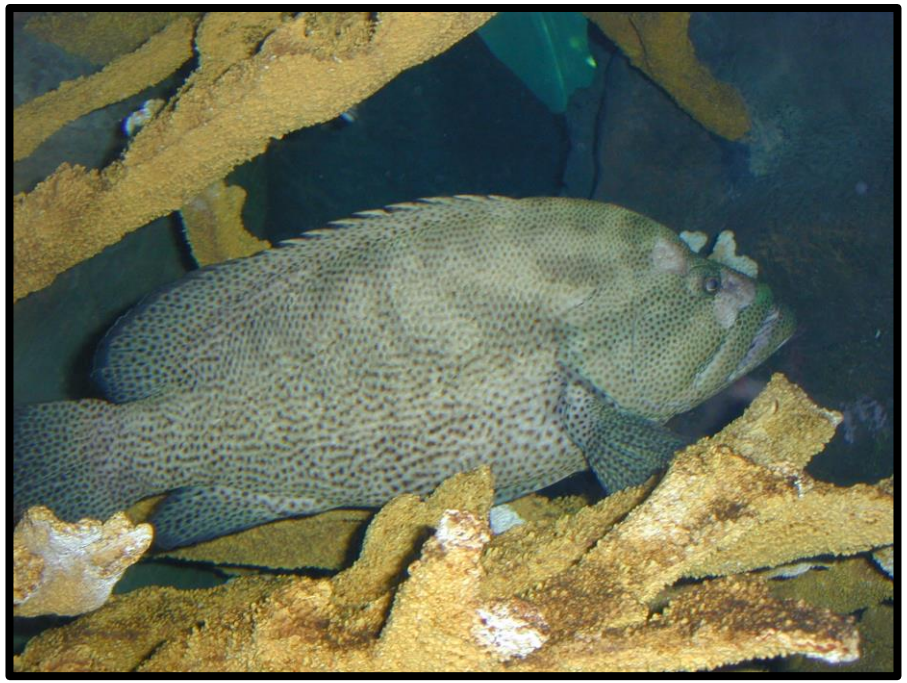
- Recognize signs of illness
- Collect appropriate samples
- Diagnostic Lab support

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.”



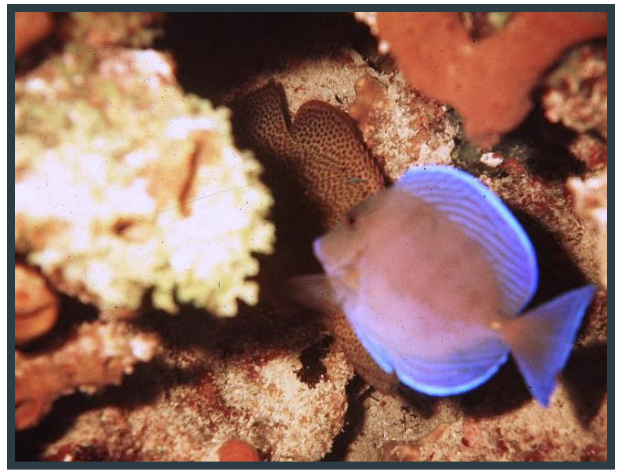
Whitaker, 1999

The Big Goals…

Health Management
Disease Prevention

Protect Existing Collections

- Avoid bringing new disease in
- Minimize costly treatments in large exhibits



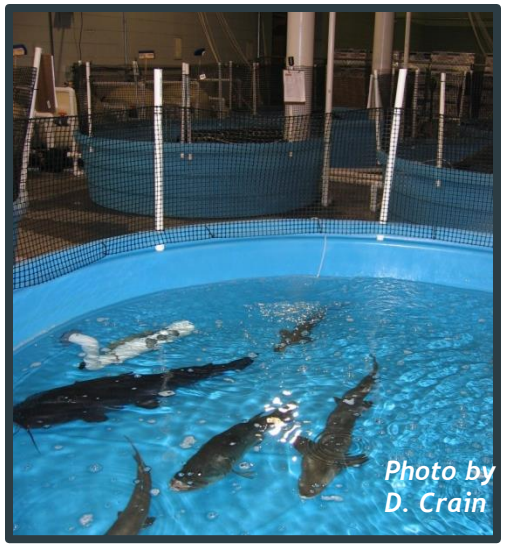
Allow New Fish to Acclimate

- 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!!!

Image credit: pixabay

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!

Image: public domain pictures.net

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!)