Fish Health Management

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Overview of Talk

• Introduction to fish health
• Types of disease
  – Dietary
  – Water Quality
  – Infectious
• Signs of disease
• Diagnosis and treatment

http://www.ag.auburn.edu/fish/image_gallery/data/media/61/ESC.jpg
Fish Health

• Health of fish is dependent on many factors
  – Environmental conditions
    • Quality of diet
    • Stocking density
    • Quality of water
  – Sources and types of pathogens
  – Species/strain of fish

Feed

• Use a species-appropriate high quality feed
• Different formulations for different life stages
  – Starter feed
  – Fingerling feed
  – Grow-out feed
• Nutritional deficiencies lead to growth defects, internal organ dysfunction, anemia, etc.
• Poor diet can lead to immune dysfunction, resulting in increased risk of infection
Stocking Density

- High density increases disease transmission
- Reduces water quality
- Increases stress
Water Quality

- Poor water quality can
  - cause stress and hinder immune responses
  - support the growth of unwanted microbes
  - directly result in mortality
Water Quality Parameters

- Temperature, pH, dissolved oxygen
- Nitrogen
  - Ammonia
    - $\text{NH}_3/\text{NH}_4^+$
  - Nitrite ($\text{NO}_2^-$)
  - Nitrate ($\text{NO}_3^-$)
- Chlorine
- Alkalinity and hardness
- Dissolved gases

### Total Ammonia Nitrogen (TAN) - ppm

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<th>6.4</th>
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*Use this table to find out when ammonia levels will start to become toxic to your fish.*
Nitrogen Cycle

Biological filtration

\[ \text{NH}_3/\text{NH}_4^+ \rightarrow \text{NO}_2^- \rightarrow \text{NO}_3^- \]

Bacteria are necessary!
Maintaining a Biofilter

- Adequate surface area
- Aeration – $O_2$ is required
- Limited use of chemicals in the system
  - Disinfectants
  - Antibiotics
  - If used, the microbes need time to recover and recolonize
Infectious Agents

- Fish are susceptible to various infectious agents
  - Bacteria
  - Viruses
  - Fungi
  - Parasites
Opportunistic Infectious Agents

• Cause disease when fish are stressed or injured
  – Organisms may always be present in a system
  – *Flavobacterium, Streptococcus*

• Although these organisms are present, the immune system of healthy fish prevents disease outbreaks
Primary Infectious Agents

• Pathogens that infect healthy fish
  – Tend to cause more severe infections
  – Tend to be harder to treat

• Prevent using strict biosecurity measures

• Stressful conditions will allow these to spread faster and be harder to treat
Susceptibility of Fish to Infection

• Young fish tend to be more susceptible
• Some pathogens are species or strain-specific, while others infect many species
• Stress increases susceptibility
  – Temperature, pH, water quality, etc
• Nutritional deficiencies increase susceptibility
Identifying Disease in a Population

- Behavior changes
  - Off feed
  - Piping
  - Erratic swimming
  - Lethargy

- Physical changes
  - Lesions
  - Popeye
  - Dropsy
  - Discolored gills
What to Do Next

• Remove any dead fish immediately
• If possible quarantine sick fish
• Review water quality records; check feed
• Contact a veterinarian and/or submit fish to a diagnostic lab
  – Ship live if possible
  – Dead on ice is next best
Treatments

• Work with a veterinarian on developing a treatment strategy
  – Antibiotics may work for bacterial infections
    • Difficult if fish are off feed
  – Chemical/bath treatments may work for fungal or parasitic infections
    • Limited approval
    • Impractical for pond culture
“An ounce of prevention is worth a pound of cure”

- Purchase eggs/fingerlings from a reputable dealer; ensure certified pathogen-free
- Vaccinate if available
- Maintain proper water quality
- Implement strict biosecurity measures
  - Disinfect equipment
  - Quarantine incoming fish
  - Limit access
- Be familiar with common diseases
- Train staff to recognize disease signs
Minimizing Stress

• Use appropriate stocking densities
• Maintain proper water conditions
• Minimize handling
• Maintain good water quality
• Use an appropriate feed
• Reduce the presence of predators
In Summary...

- Fish health is dependent on many factors
  - Environmental
  - Types of pathogens
  - Fish species and age

In Summary…

• The best treatment is prevention
  – Quality fish
  – Good water quality
  – High quality feed
  – Minimize stress
  – Minimize cross-contamination between systems
In Summary

• If abnormal mortalities occur and signs of disease are present
  – Consult a fish health professional
  – Submit specimens for diagnostic testing
  – Apply treatments as directed
  – Review biosecurity protocols
Resources

- **RAC Publications:** [https://www.ncrac.org/publications](https://www.ncrac.org/publications)