



# Chapter 5



## Care and Handling of Sampled Organisms

# 5.1 Care and handling of sampled organisms

- Care and handling of live fish



- Care and handling of specimens and tissues

## 5.2 Care and handling of live fish - Experimentation

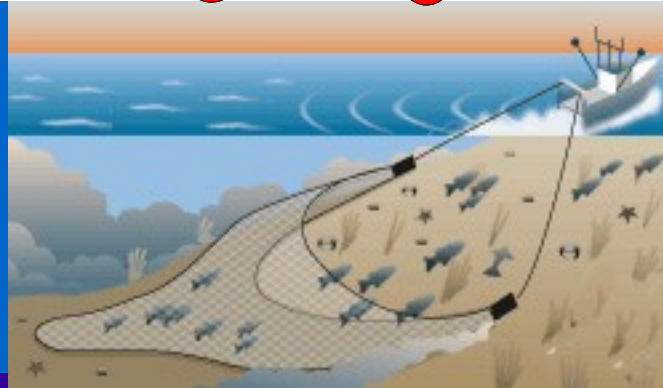
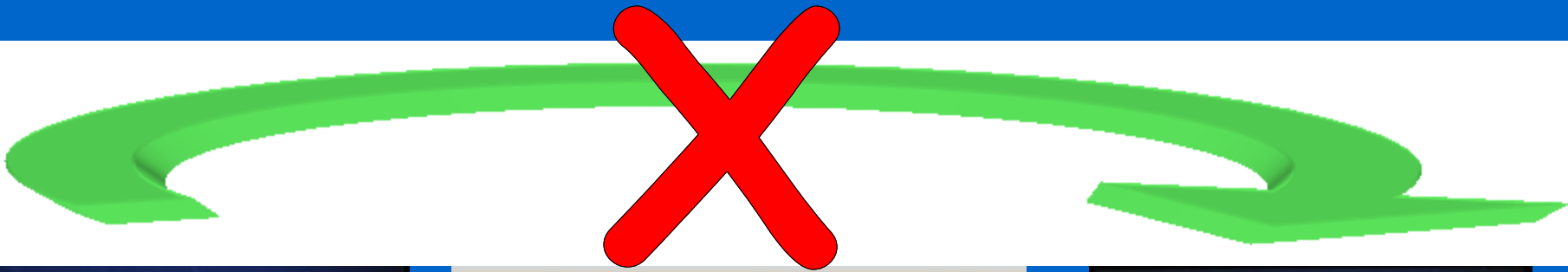


- Follow guidelines
- Minimize stress
- Acceptable water quality
- Proper use of anesthetics
- Overseen by professional



# Endangered species - Capture techniques that reduce

- Potential mortality
- Habitat destruction



# Methods for care and handling

- Minimize stress
- Avoid changing variables away from the optimum
- If optimum is unknown, avoid changing conditions from original
- Allow time for acclimation
- (Refer to Fig 5.1 Pg. 124)



# Capture



- Long period gear- high stress
- Short period gear- low stress



# Handling

- **Keep handling time to the minimal**
- **Avoid handling with bare hands**
- **Possible to contract disease agents**



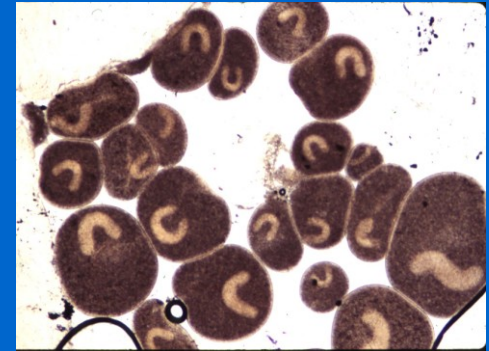
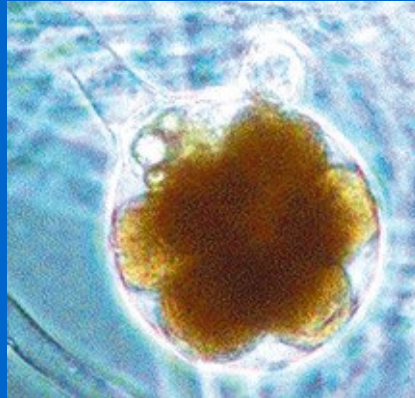
# Anesthetics-effects

- Tranquilization
- Non-response to external stimuli
- Loss of equilibrium
- Cessation of ventilation
- Death

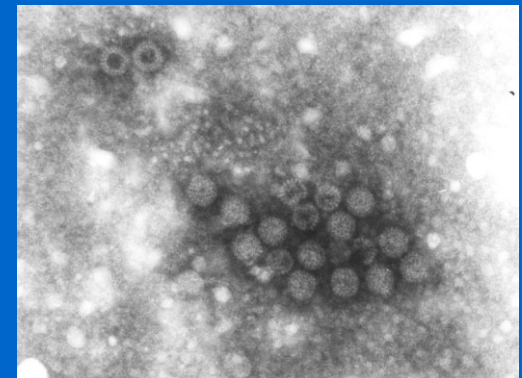




# Prophylactic treatments



- Minimize infection; bacteria, fungi, parasites and viruses
- Effectiveness varies by
  - Concentration
  - Duration



# Treatments administered by



- Feed
- Baths
- Adding treatment to water

# Pollutants - Ensure fish are not exposed to

- Chlorine
- Detergents
- Petroleum hydrocarbons
- Ammonia



**DANGER: CORROSIVE.**  
CONTAINS SODIUM HYPOCHLORITE, 6.00%  
BY WEIGHT. CAUSES SEVERE BUT  
TRANSIENT IRRITATION.



# Tagging and marking

- Care taken to reduce scale loss
- Minimize time out of water
- Minimize slime removal (antibacterial barrier)



# Holding and hauling



- Aquaculture
- Hatchery stocking
- Endangered species management

# Stress involved in holding and hauling

- Low DO
- Extreme temperatures
- Rapid temperature changes
- Diseases
- Intense light
- Physical shock



# Mitigation of stress by

- Anesthetics
- Starvation prior to transport
- Minimization of crowding
- Reduced sloshing in tanks
- Reduce osmotic costs
- Use cool temperatures



# Oxygen -Critical to maintain adequate oxygen

- Hypoxia -low oxygen
- Increased ventilation rate
- Gulping air at surface
- Loss of equilibrium
- Death





# Temperature

- Controls metabolic rate of fish
- Avoid changes in temperature
- Exceeding limit causes death
- Affects other water quality parameters



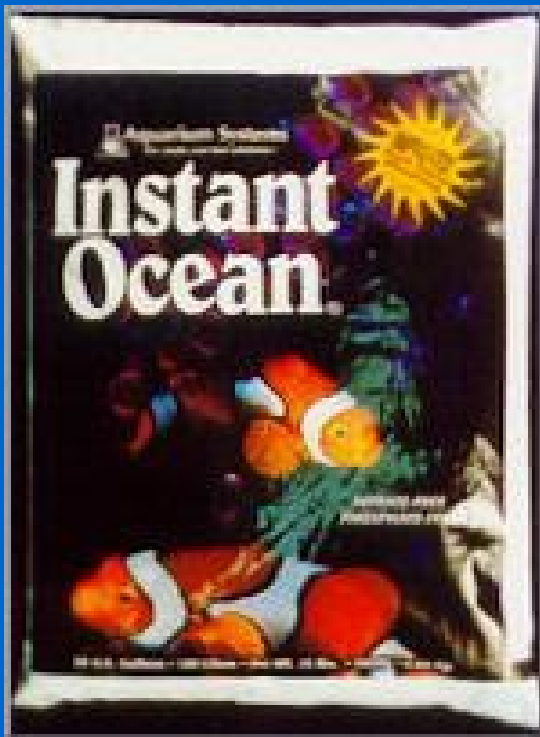
OR



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# Salinity



- Can reduce stress
- Electrolyte balance
- Hypertonic
- Hypotonic
- Dissolved substances must remain constant

# Ammonia

- Waste product of protein catabolism
- Highly toxic to fish
- Un-ionized ammonia is toxic  $\text{NH}_3$
- Ionized ammonia is not  $\text{NH}_4^+$

## 5.3 Handling of specimens and tissues - Identification

- Use dichotomous key
- Match identification to distribution

### Key To The Gars

- 1A. Snout long and narrow, its least width into its length more than 10 times; width of upper jaw at nostrils less than eye diameter.     *Lepisosteus osseus*
- 1B. Snout short and broad, its least width into its length less than 10 times; width of upper jaw at nostrils greater than eye diameter.     2
- 2A. Snout short and very broad, its width at nostrils 1.5 or more times eye diameter; distance from tip of snout to corner of mouth shorter than rest of head; 59 or more gill rakers on first gill arch; size large, often exceeding 8 pounds.     *Atractosteus spatula*
- 2B. Snout of moderate length and breadth, its width at nostrils 1.0-1.5 times eye diameter; distance from tip of snout to corner of mouth longer than rest of head; 35 or fewer gill rakers on first gill arch; size small, not exceeding 8 pounds.     3

# Preserved specimens and tissues

- Prepare quickly after capture
- Mark clearly
- Include in documentation
  - Collection information
  - Collector information
  - Specimens
  - Preservation method



# Whole specimen preparation - Methods

- Fixation
- Skeleton preparation
- Freezing
- Photography
- Clearing and staining
- Freeze drying
- Lyophilization
- Radiography

# Fixation



- Cells and tissue treated to prevent autolysis
- Maintains structural integrity

# Fixation (cont.)

- **Uses formaldehyde-toxic**
  - Use in well ventilated area
  - Wear eyewear
  - Use waterproof or latex gloves



- **Also used for ichthyoplankton preservation**

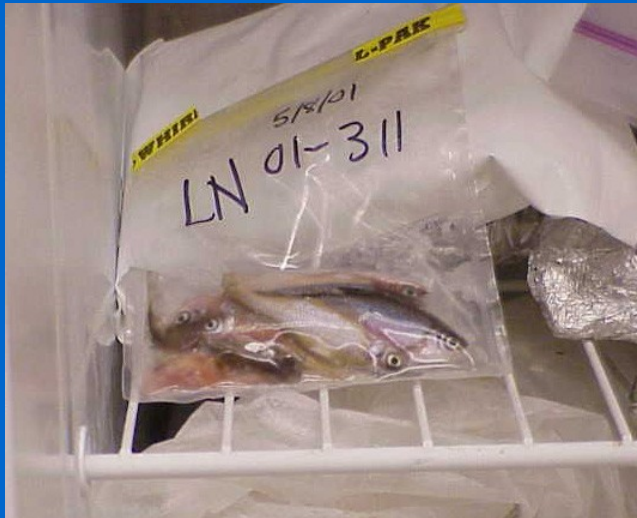


# Skeletonization



- For large specimens
- All desired information recorded before skeletonization
- Skeletons are frozen, salted or fixed

# Freezing



- Most convenient method
- Good for specimens of uncertain use

- Tagged
- Plastic bag to prevent lyophilisation



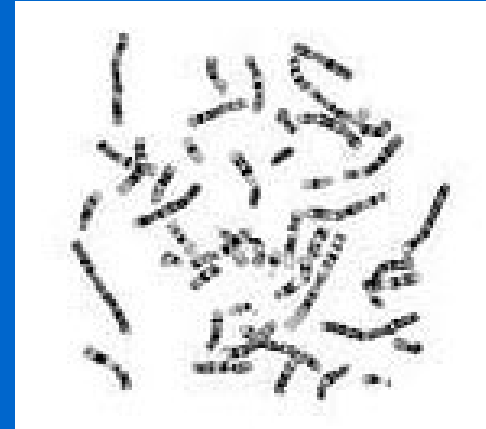
# Photography

- Endangered species
- Maintains color
- Very large specimens-sharks
- Take of left side



# Genetic studies

- Chromosome characterization
- Allozyme and isozyme analysis
- DNA analysis

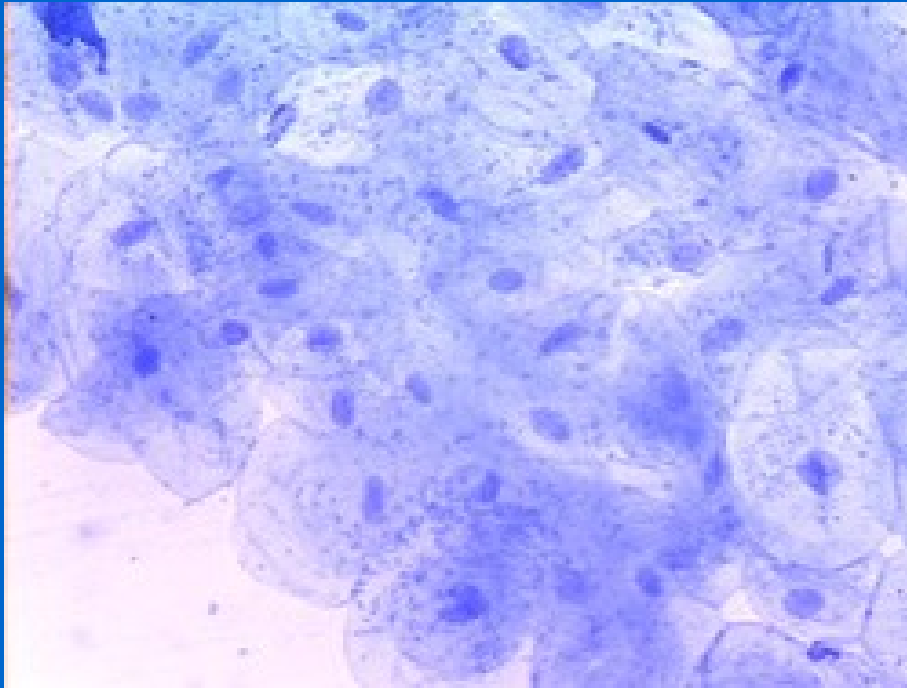


# General considerations

- **Minimize risk of cross-contamination**
  - Wear gloves
  - Wash gloves with alcohol
  - Instruments should be unused or sanitized
- **Samples should not be fixed with formalin for genetic testing**



# Karyotypes prepared



- From epithelial tissue
- From live cells

# Blood drawing



- Caudal blood vessel
- Fish placed on back
- Hypodermic needle inserted towards vertebral column
- Blood cooled on ice before processed

# Tissue preservation for genetic analysis



- Freezing
- Drying
- Liquid preservation



# Ichthyological collections



- Organization of ichthyological collection
  - Sorted
  - Unsorted
  - Type
  - Borrowed

# Use of ichthyological collections

- **Personal safety**
  - Wear gloves
  - Ensure adequate ventilation
  - Wear safety glasses



# Use of ichthyological collections

- Care of preserved material
  - Minimize destruction
  - Avoid tearing delicate parts
  - Do not work too many open jars
  - Store in room with adequate ventilation



# Use of ichthyological collections

- Visit to and loans from collections
  - Planned
  - Permission

