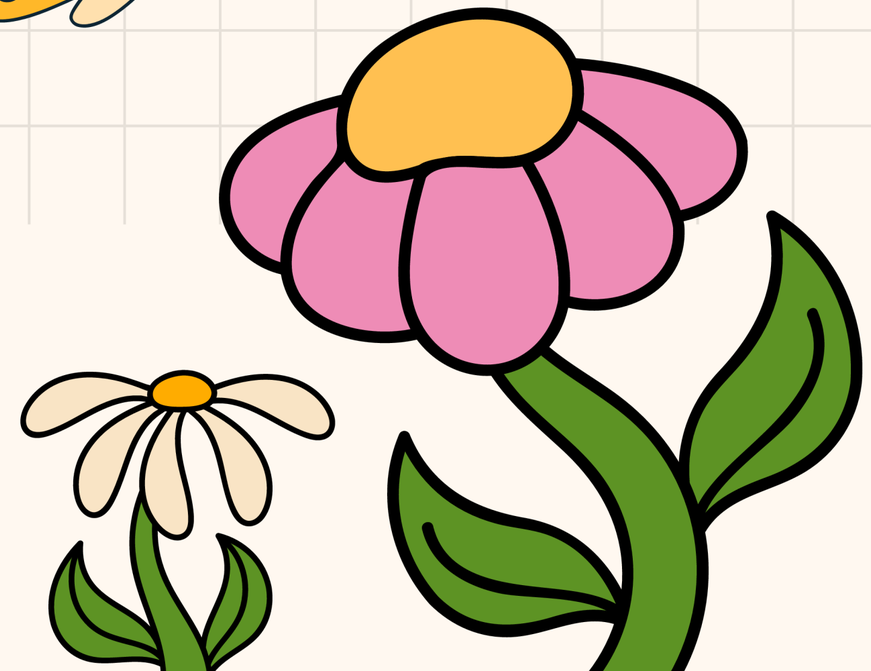
SUFFOCATING IN SILENCE: THE HIDDEN DANGER OF HYPOXIA

LEARNING OBJECTIVES

By the end of this module, students should be able to:

1. Define hypoxia in aquaculture.
2. Explain the causes and effects of hypoxia in crab farming.
3. Identify behavioral and physiological signs of hypoxia stress in Portunus trituberculatus.
4. Understand why real-time oxygen monitoring is essential in crustacean aquaculture.



WHAT IS HYPOXIA?

Hypoxia is a condition where dissolved oxygen (DO) in water falls below critical levels.

In aquaculture, hypoxia is typically defined as DO < 2 mg/L.

Crabs, especially swimming crabs, are highly sensitive to oxygen fluctuations.

CAUSES OF HYPOXIA IN AQUACULTURE SYSTEMS

- Overstocking of animals in limited space
- Poor water circulation or aeration
- Excess feed leading to high organic waste
- Algal bloom crash (sudden death of algae consumes oxygen)
- High temperatures (warmer water holds less oxygen)

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EFFECTS OF HYPOXIA ON CRABS

Metabolism

Slows down, reducing growth rate

Behavior

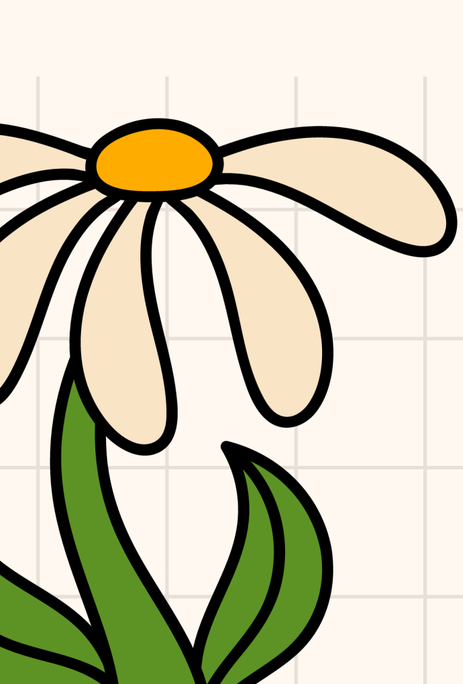
Lethargy, reduced feeding, surfacing behavior

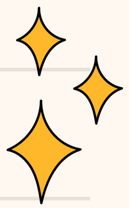
Immune response

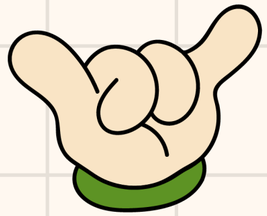
Weakened, making crabs prone to infections

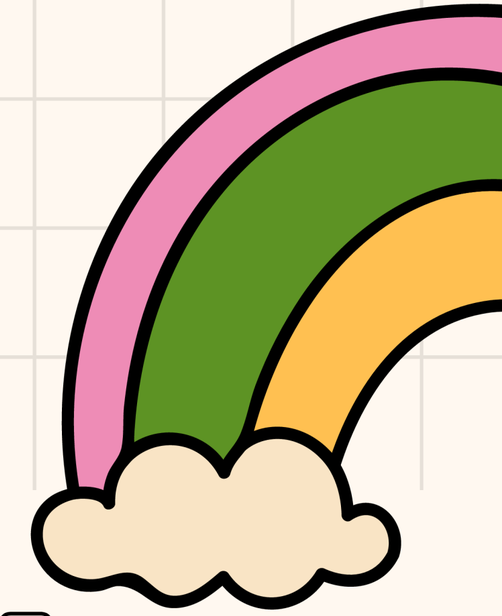
SIGNS OF HYPOXIA STRESS IN CRABS

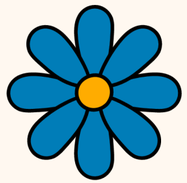
- Gasping at the water surface or near aeration sources
- Lying motionless or weak movement
- Feeding avoidance
- Change in color (due to stress or oxygen depletion in tissues)











IMPORTANCE OF MONITORING DO (DISSOLVED OXYGEN)

- Daily DO checks can prevent mass mortality.
- Use of DO sensors allows for:
  1. Real-time alerts
  2. Better decision-making for water exchange and aeration
  3. Reduced risk of economic loss