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THE UNIVERSITY OF FLORIDA
INSTITUTE OF FOOD AND AGRICULTURAL SCIENCES

Stress–Its role in fish diseases

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What causes stress?

Stress is a condition in which an animal is unable to maintain a normal physiologic state because of various factors adversely affecting its well-being.

Stress is caused by placing a fish in a situation which is beyond its normal level of tolerance. Specific examples of things which can cause stress (stressors) are listed below.

Chemical stressors:

(1) Poor Water Quality - low dissolved oxygen, improper pH

(2) Pollution - intentional pollution: chemical treatments - accidental pollution: insect spray, spills

(3) Diet composition - type of protein, amino acids

(4) Nitrogenous and other metabolic wastes - accumulation of ammonia or nitrite

Biological stressors:

(1) Population density - crowding

(2) Other species of fish - aggression, territoriality, lateral swimming space requirements

(3) Microorganisms - pathogenic and non-pathogenic

(4) Macroorganisms - internal and external parasites

Physical stressors:

(1) Temperature. This is one of the most important influences on the immune system of fish.

(2) Light

(3) Sounds

(4) Dissolved Gases

Procedural stressors:

(1) Handling

(2) Shipping

(3) Disease Treatments

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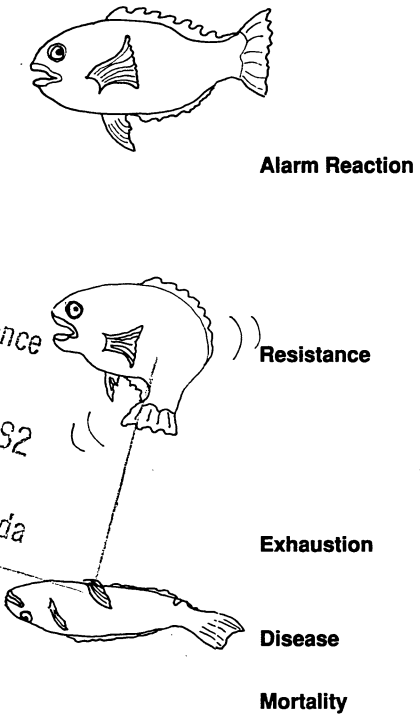

Figure 1. Stress triggers a chain of events which result in an "alarm reaction" (fight or flight response) by the fish which then triggers a series of hormonal changes. As the fish tries to adjust to the insult it uses up energy reserves, but during this time it is able to resist or compensate for the insult. If the insult is not removed, its energy reserves become depleted and the fish becomes "exhausted". At this phase its ability to resist disease organisms, with which it is in constant contact, is severely compromised and the fish may become sick or die.

Alarm reaction (fight or flight" response)

(1) Increases in blood sugar are caused by a secretion of hormones from the adrenal gland. Stored sugars, such as glycogen in the liver are metabolized. This creates an energy reserve which prepares the animal for an emergency action.

(2) Osmoregulation is disrupted because of changes in mineral

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