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# Stress Related Physiology Changes

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# Stress Related Physiology Changes

## Introduction

"Stress" is defined in terms of the response of the animal with the stimulus being referred to as the stressor

The components of this response are collectively known as the General Adaptation Syndrome (GAS) which can be divided on a temporal basis into stages of alarm



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# Categories of stress

- Stress may be divided into three categories. They are
  - a) response to cultural procedure
  - b) response to disease
  - c) response to water pollutants
- It is the consequence of the artificial environment itself and can include such factor as temperature, salinity change, stocking density, O<sub>2</sub> concentration, pH and water velocity etc
- **First groustimulus** being referred to as the stressor. The components of this response are collectively known as the General Adaptation Syndrome (GAS) which can be divided on a temporal basis into stages of alarm



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## **Second group**

It relates to the stress of the fish that is fed and include such factors like protein quality vitamin cone., lipid type, mineral level etc .,

## **Third group**

It consist of handling procedure like capture, anaesthesia, grading, storing by sex etc.,



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# Stress response to disease and treatments

Fishes are exposed to disease related stress in both culture facilities such as density or dietary problems in the natural environment where it may also occur in conjunction with other stress such as temperature

For example

<b>Species</b>	<b>Disease</b>
S. gairdneri	Myxobacterium
O. nerka	Copper
O. gorbuscha	Bacterial kidney disease



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# Stress response to water pollutants

Man's activities have increasing impact on the natural environment of salmonoids and other fishes both in freshwater and in coastal saltwater habitats

Species	Pollutant
<i>S. gairdneri</i>	Chromium
<i>O. nerka</i>	Copper
<i>O. kisutch</i>	Ammonia



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# Action of stresses

Besides A and NA small amount of dopamine have been found in elasmobranch plasma and auxiliary bodies and in teleost plasma. In most experimental conditions involving harsh stress the amine increase by 5-20 fold in others only 2-5 fold



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# Resting level

The modulation of the adrenergic response in terms of the nature and intensity of stimulus makes it difficult to assess the resting levels of plasma A in fish

Species	Resting value
Cyclostomes	$2.5 \times 10^{-10}$
Teleosts	$2.95 \times 10^{-9}$





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## Osmotic stress

- The particular emphasis is placed on physiological effects of the osmotic stress of transferring fish from freshwater to sea some stress occurred reverse
- **Ionic stress**
- An attempt is made to define those areas of osmotic and ionic regulation which are likely to be influenced by stress. This stress is called as ionic stress



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# Stress in defence mechanism

This may be advantageous or injuries. to the animal concerned depending upon the complex interaction below the stress factors and the animals physiological state which will eventually determine how well the animal will adapt to the situation

Thermal stress is defined as any temperature change that produces a significant disturbance in the normal function of a freshwater teleost



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Fishery managers should be concerned with optimizing the space of the realized performance capacity of their stocks

Mostly as stress plays a physiological load on the fish, there by reducing its capacity to perform with regard to subsequent stresses the appropriate recovery time depends upon the severity and duration of the initial stress