TEMPERATURE

Temperature is measured by the **thermometer** and under water by **thermistor.**

Effect of Temperature of plants -

Temperature causes **dessication** (injury due to dehydration), **chilling injury** (injury of plant due to cold climate) and **freezing injury** (injury to plant cells due to ice crystal formation in the intercellular spaces)

Effect of Temperature on animal -

Temperature affect the absolute size of an animal and its body parts.

1. **Bergman rule -**
   Birds and mammals attains greater body size in cold region and lesser in warm region.

2. **Allens rule -**
   The tail, ears, limbs, eyes snout and hair of mammals are smaller in colder region and larger in warm region.

3. **Jorden's rule -**
   Fishes in cold water posses more vertebrae than those living in warm water.

4. **Gloger rule -**
   Warm blooded animals in hot and humid area (tropical region) are more darker in colour (heavily pigmented) that cold area.

5. **Renschs rule -**
   Birds in cold region have narrow wings and in warm region have broader wings

SOME EXAMPLES OR MIGRATION

Note : Thermal Migration - Thermal migration has been seen in birds (Siberian cranes, arctic tern), mammals (Bison, carbiou), fishes (salmon) etc.

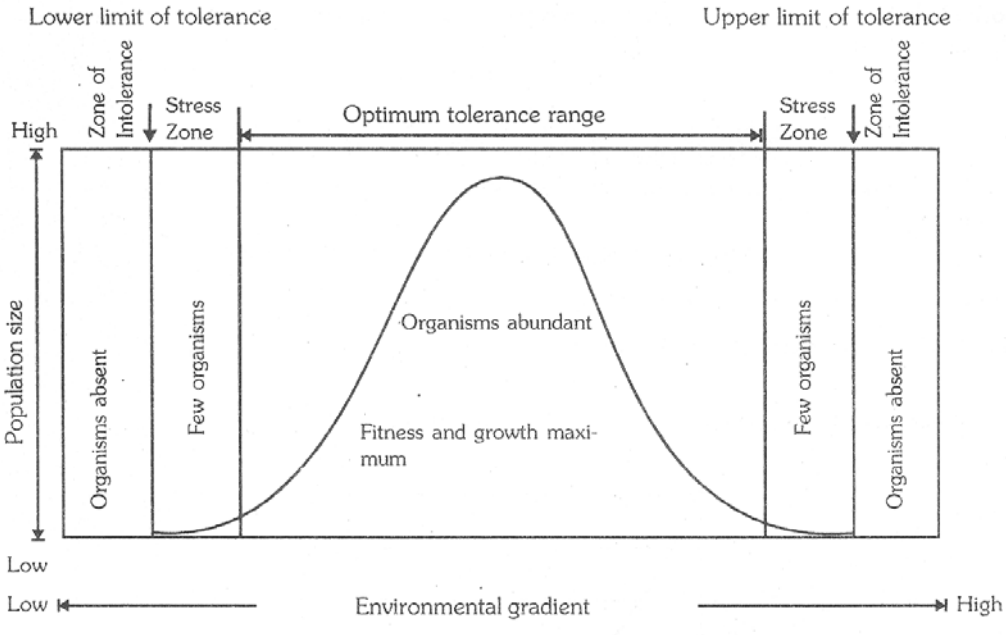
Acclimatisation -

- Acclimatisation is a gradual physiological adjustment of the organism to the slowly changing new environmental condition. If there is a shift in some environmental factor beyond the tolerance range of
- an organism the latter can come to the resting stage or migrate or can undergo acclimatisation.

Shelford law of tolerance -

Every organism ahs minimum and maximum limit of tolerance **(ecological amplitude)** with respect to] environmental factors like temperatures, sunlight or nutrient concentration in between those limitsthecentral optimum range are found in which organisms are abundant this is knows as **optimum**

zone of tolerance.



The response of an organism to a range or gradient of an environmental factor (temperature, light, nutrient).

On the basis of temperature vegetation is dived into four groups

- **Megatherms -** The plants growing in thigh temperature throughout the year
  e.g. Tropical rain forest
- **Mesoterms -** The plants growing in alternate high and low temperature• **Megatherms -** the plants growing in high te4mperature throught the year
  e.g. tropical rain forest
- **Mesotherms -** the Plants growing in alternate high and low temperature
  e.g. Deciduous tropical forest
- **Microtherms -** Plants growing in low temperature
  e.g. Coniferous forest
- **Hakistotherms -** Plant growing in very low temperature e.g. alpine vegetation

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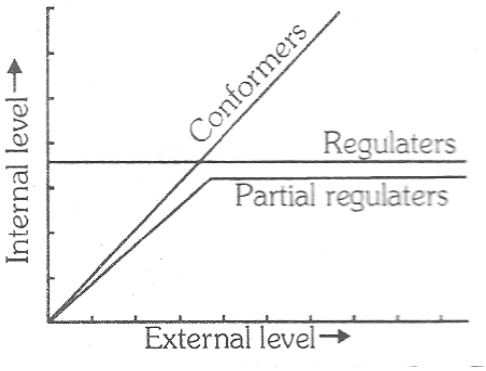
On the basis of temperature animals divided into two groups

(1) Eurythermous or Homeo thermal/endo thermal /warm blooded - Animals which are able to tolerate wide variation of temperature
e.g. birds, man, etc.

(2) Stenothermous or Poikilothermal/ecto thermal/cold blooded - Animals which are unable to tolerate wide variation in temperature
e.g. Arctic fishes Reptiles, Amphibians

Regulaters:
Organisms who are able to maintain homeostasis by physiological (some time behavioural also) means which ensures constant body temperature, (thermoregulation) constant osmotic concentration (osmoregulation) e.g. all birds and mammals.

Conformers:
Organisms who cannot maintain a constant internal environment means their body temperature or osmotic concentration change with external environment.



Note : If the stressful external condition are localised or remain only for a short duration the organism has to alternatives to survive.

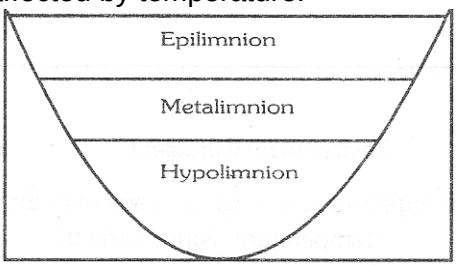
(i) Migration (ii) Suspension

THERMAL STRATIFICATION IN LAKES

Thermal stratification occurs in deep water body because of difference in temperature of water at different depth.

Mainly three layer or zone occurs in water below

1. **Epilimnion -** The top layer gains warmth.
2. **Metaliminiion/thermocline-** Middle region steady decline in temperature or a gradual change in temperature.
3. **Hypolimnion -** Bottom which is not affected by temperature.



Difference in temperature of water at different depths results in thermal stratification in deep water bodies. During summer, temperature is higher on the surface water, whereas in lower layer temperature is low. During winter in a temperature lake, water is at freezing temperature on the surface, whereas in the lower layer temperature is about 4^0C. The surface water is cooled during autumn, and warmed in spring. This results in a free mixing of water in the whole water body, also known as autumn and spring turnover. During spring and autumn due to turnover of water oxygen and nutrients are redistributed, resulting in a bloom of phytoplankton growth while during winter and summer, **growth of phytoplankton** is low due to low nutrients and oxygen availability.

