**ECOLOGY**

**Lecture (9-10).**

**Limiting factor**

In biology, a limiting factor is a [resource](http://en.wikipedia.org/wiki/Resource_%28biology%29) or environmental condition that limits the growth, abundance, or distribution of an organism or a population of organisms in an ecosystem.

**Low of Limiting factor**

1. **Liebig's Law of minimum:** states that growth is controlled not by the total amount of resources available, but by the scarcest resource.
2. **law of tolerance by EV.E.Shelford in 191:** Not only may too little of something be a limiting factor, as proposed by liebig but also too much as in the case of such factors as heat light and water.

**Some principles to the law of tolerance may be stated as follows:**

1. organisms may have a wide range of tolerance for one factor and a narrow range for another.
2. organisms with wide ranges of tolerance for all factors are likely to be most widely distributed.
3. when conditions are not optimum for a species with respect to one ecological factor the limits of tolerance may be reduced for other ecological factor the limits of tolerance may be reduced for other ecological factor, for example when soil nitrogen is limiting the resistance of grass to drought is reduced.in other words more water was required to prevent nitrogen levels than at high levels.
4. organisms in nature are not actually living at the optimum range of particular physical factor.
5. the limits of tolerance for reproductive individuals seeds eggs embryos seedlings and larvae are usually narrower than for non-reproducing adult plants or animals.

For the relative degree of tolerance a series of terms have come in to general use in ecology that use of the prefixes STENO , meaning narrow

EURY , meaning wide.

Light, temperature and water(rainfall) are ecological factors on land. Light, temperature ,and salinity are the important ones in the sea and oxygen may be major importance in fresh water.

**Physical factors**

1. light and light penetration
* **Photic zone**: depth to which light is penetrates zone of photosynthesis and primary production.
* **Aphotic zon**e: is below photic zone Most of ocean is dark

1. **Temperature**

a. Most marine organisms are ectothermic

* same body temperature as the surrounding water.
* clams, shrimp, most fish...

b. Some marine organisms are endothermic .

* constant and usually higher body temperature than the surrounding water.
* marine mammals, birds, some tuna and sharks.
1. **salinity**
2. **Pressure.**
3. **O2.**
4. **Dissolved nutrients.**

 **LIMITING FACTORS ON LAND**

1. **LIGHT:**

**Photoperiodism** is the physiological reaction of organisms to the length of day or night. It occurs in [plants](http://en.wikipedia.org/wiki/Plant) and [animals](http://en.wikipedia.org/wiki/Animal). The plant can classified according **Photoperiodism** as:

1. **Long-day plants:** Long-day plants flower when the night length falls below their critical photoperiod. These plants typically flower in the [northern hemisphere](http://en.wikipedia.org/wiki/Northern_hemisphere) during late spring or early summer as days are getting longer. In the northern hemisphere, the longest day of the year (summer solstice) is on or about 21 June. After that date, days grow shorter (i.e. nights grow longer) until 21 December (the winter solstice). This situation is reversed in the southern hemisphere (i.e., longest day is 21 December and shortest day is 21 June).
2. **Short-day plants:** Short-day plants flower when the night lengths exceed their critical photoperiod.

### Day-neutral plants: Day-neutral plants, such as [cucumbers](http://en.wikipedia.org/wiki/Cucumber), roses, and tomatoes, do not initiate flowering based on photoperiodism. Instead, they may initiate flowering after attaining a certain overall developmental stage or age, or in response to alternative environmental stimuli, such as [vernalisation](http://en.wikipedia.org/wiki/Vernalisation%22%20%5Co%20%22Vernalisation) (a period of low temperature).

1. **WATER FACTOR:**
2. **XEROPHYTE:** Plants that live in conditions where water is scare (for example in the desert)
3. **MESOPHYTE:** Land plants living in environment with moderate amount of moisture.
4. **HYDROPHYTE:** A plant adapted to grow in water.
5. **TEMPERATURE FACTOR:**
6. **OLIGOTHERMAL**(microthermal) is an [organism](http://en.wikipedia.org/wiki/Organism) that can live in an environment that offers very low levels of temperature.
7. An **POLYTHERMAL**(megathermal) is an [organism](http://en.wikipedia.org/wiki/Organism) that can live in an environment that offers very high levels of temperature.
8. An **MESOTHERMAL** is an [organism](http://en.wikipedia.org/wiki/Organism) that can live in an environment that offers medium levels of temperature.

**SOIL**

**Soil** is the mixture of [minerals](http://en.wikipedia.org/wiki/Minerals), [organic matter](http://en.wikipedia.org/wiki/Organic_matter), gases, liquids, and the myriad of organisms that together support plant life.

