**Dr. Rima Kumari: Date: 28/08/2020**

Online class and e- content for BSc IIIrd year students

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| Date and Time | Online class medium | E. content topic |
| 28/08/2020  01:30 p.m to 2.20 p.m | Via Google meet  Link: Meeting URL: https://meet.google.com/zhh-wnqe-eay | **Vernalization details,**  **Plant movement**  **Autonomic movement** |

**Requirement of vernalization:**

(i) Low temperature : Low temperature required for vernalization is usually 0−4oC is most of the cases. The chilling treatment should not be immediately followed by high temperature (i.e., about 40oC), otherwise the effect of vernalization is lost. This phenomenon is called de-vernalization.

(ii) Duration of low temperature treatment : It varies from species to species from a few hours to a few days.

(iii) Actively dividing cells : Vernalization stimulus is perceived only by actively dividing cells. Therefore, vernalization treatment can be given to the germinating seeds or whole plant with meristematic tissues and other conditions.

(iv) Water : Proper hydration is must for perceiving the stimulus of vernalization.

(v) Oxygen : Aerobic respiration is also a requirements for vernalization. The stimulus has been named as vernalin (reported by Mechlers).

**Process of vernalization :** Usually vernalization treatment is given to the germinating seeds. The seeds are moistened sufficiently to allow their germination. They are then exposed to a temperature of 0−4oC for a few weeks and sown to the fields. Lysenko developed the process of vernalization it is completed in two stages.

(i) Thermostage : Germinating seeds are treated with 0-4oC in presence of oxygen and slight moisture. The seed dormancy is broken.

(ii) Photostage : The stage is very essential to initiate the reproductive phase. After vernalization plants must be subjected to a correct photoperiod in order that they may produce flowers.

**Importance of vernalization**

(i) Vernalization is believed to overcome some inhibitor and induce synthesis of growth hormones like gibberellins.

(ii) It reduces the vegetative period of plant.

(iii) It prepares the plant for flowering.

(iv) It increases yield, resistance to cold and diseases.

(v) Vernalization can remove kernel wrinkles in wheat.

(vi) Vernalization is beneficial in reducing the period between germination and flowering. Thus more than one crop can be obtained during a year.

**Plant movement:**

Plants show movements in response to a variety of stimuli. Stimulus can be defined “as a change in external or internal environment of an organism that elicits response in the organism”. The reaction of plant to a stimulus is known as response. The power or ability of a plant to respond to a stimulus is called sensitivity or reactivity or irritability.

The movements which occur without the effect of external stimulus are called autonomic or spontaneous movements. Thus spontaneous movements are brought by definite internal stimulus, and if the movements are produced in response to external stimulus, they are known as paratonic or induced movements.

The area which perceives a stimulus is called perceptive region, while the plants part showing the response is known as responsive region. The minimum duration or time required for a stimulus to be applied continuously on the perceptive region to produce visible response is called presentation time. The duration between the application of stimulus and production of visible response is called latent time or reaction time.

**Classification of plant movements**

Plants movements are broadly classified into two types:

(1) **Movements of locomotion:**In this case, plant moves physically from one place to another. The movements of locomotion are of two type-autonomic (occurs spontaneously) or paratonic (induced by external stimuli).

(i) **Autonomic movement of locomotion** **:** These movement of locomotion are due to internal stimuli they are of following types :

(a)**Ciliary movements :** Certain motile algae (e.g., Chlamydomonas, Volvox, etc). Zoospores and gametes of lower plants move from one place to another by means of cilia or flagella.

(b) **Amoeboid movements :**It is the movement of naked mass of protoplasm by means of producing pseudopodia like process e.g., members of Myxomycetes (slime fungi).

c) **Cyclosis :**These are movements of cytoplasm with in a cell (also called protoplasmic streaming).  These are of two types :

* **Rotation :**When the protoplasm moves around a single central vacuoles in either clockwise or anticlockwise direction *e.g.,* leaf cells of *Hydrilla, Vallisneria*.
* **Circulation :** When the movement of protoplasm accurs around different *vacuoles* in different directions within the cell *e.g.*, staminal hair of Tradescantia, shoot hairs of gourds.

(d) **Excretory movements :** Apical part of *Oscillatoria* is like a pendulum. It is considered that such movements are due to excretion of substances by the plants. (movements opposite to the side of excretion).