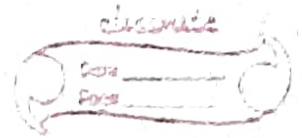


- 19th Mangsir, December 6.

Plant Growth Regulation



Plant Growth:-

Growth is a permanent and irreversible change of volume or size and increase in dry weight of a living body or plant. A growth is a vital process that brings about a permanent change in any plant or its parts in respect to size, form, weight and diameter.

Hormones:-

The substances that cause the growth and differentiation processes are called growth regulation or growth hormones.

The plant hormones are organic compounds produced within the plant body and regulate growth and development.

Important characters of plant hormones

1. Growth hormones are usually produced at the apex of roots, stem and leaves.
2. They are transported and transmitted one part to other parts of plant through xylem or phloem or both.
3. They produce new tissue or promote the growth of very low concentration.
4. They are organic in nature.
5. They are used in extremely low amount.
6. They are also called phytohormones.

Types of plant hormones:-

① Auxin hormones:-

Auxin was produced or identified as the first group of plant hormones, it was first reported by (Oat) by coleoptile curvature test and found that auxin induced growth in plant. It is synthesized in the coleoptile tip and translocated downward produced cell elongation without division.

Auxin are synthesized in the shoot and root apex, which move from apex to base by diffusion through phloem.

Role of auxin:- 2 S.G.

i. cell elongation:-

which cell elongation is the most important function of auxin, promotes the elongation of shoot and root tip behind the apical meristem. It makes the cell wall plastic and allow the flow of water fast that cause swelling of cell.

ii. Root formation:-

Auxin promotes root formation in cutting ends of plant parts.

iii. Flower initiation:-

NAA (Naphthalene acetic acid) and 2,4-D are used to induced's flow^{ing} in rice and pineapple.

iv. Parthenocarpy:-

Application of auxin like IAA (Indole acetic acid) and IBAC (Indole butyric acid) to unpollinated flower parts makes them develop into seeds fruits ~~as~~ or parthenocarpy.

v. Apical Dominance:

It is a phenomenon by which presence of apical bud, the lateral bud donot grow properly. when the apical bud is removed lateral bud grow. Auxin synthesis in the apical region inhibits the development of lateral bud.

vi. Controlling abscission.

Abscissions means flating of leaves or fruits. Auxin in the abscission zone prevent the formation of abscission layer and controls the dropping of pre-matured fruits and flower.

vii. Tissue culture.

Auxin like 2,4-D, NAA and IBA is used in root initiation and callus production in tissue culture.

viii. Weedicides.

Auxine like 2,4-D is used as weedicides. In high concentration of auxin is toxic to dicots but non-toxic to monocots so it is used as selective weed killer in crops fields and lawns.

(2) Cytokines :-

Cytokines are basic in nature. It was 1st discovered by Miller et al in 1955 from degraded sample of DNA of yeast and coconut milk named kinetin. Cytokines synthesis in the dividing cells like fruits seeds and embryo of plants.

SQ Role of cytokinin

- i) cell division - The important role of cytokinin is to produce cell division in plant specially in the presence of auxin.
 - ii) cell enlargement - cytokinin cause the enlargement of cell in leaf cotyledons and pith of tobacco.
 - iii) Dormancy - It is also used in breaking the dormancy of seed and other plants organs.
 - iv) Protein synthesis - cytokine increase the rate of protein synthesis.
 - v) Delay Senescence - Application of cytokine delay senescence to intact plant parts.
 - vi) Contraction of apical dominance - Application of cytokinin promotes the growth of lateral buds.
 - vii) Promotes cell differentiation - cytokinin play an important role in the initiation of plant organ in callus.
- High concentration of cytokinin and auxin ratio produce shoot formation.
 - low concentration of cytokinin and auxin ratio produce root formation.
 - Moderate concentration of cytokinin and auxin ratio produce both root and shoot formation.
 - Moderate concentration of cytokinin and less concentration of auxin ratio produce mitosis cell division.

[3] Gibberellins (G.A)

Gibberellins are acidic in nature produced from a fungus Gibberella fujikuroi. cause a disease in rice seedling called Bakanae disease in Japan. The active substance located and isolated from the extract of fungus having capacity to stimulate abnormal growth called Gibberellins. They are synthesized in the apical shoot, bud root, HP and developing seed. they move in all direction through both xylem and phloem.

Role of Gibberellins:-

1. stem and leaf growth: Gibberellins elongates stem by enlargement of cells.
2. elongation of dwarf shoot: Genetically dwarf varieties of plant such as pea, maize can be induced to growth normal height by the application of gibberellins.
3. flowering: - It promotes flowering in plants long day plant during non-induction process.
4. Sex expression: Gibberellins promotes the male flower on genetically female plant of cucurbita.
5. Parthenocarpy: - like auxin, gibberellins also induce the formation of seedless fruits.

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Bolting in rosette plant: - Bolting is the elongation of reduced stem such as cabbage, cauliflower, internode, growth or length is very short giving rosette appearances. Application of Gibberellins increase internode length in that plant.

7. Delay falling of fruits:- Ripening of fruits on some plant like citrus can be delayed with the help of Gibberellins and also p in pre-mature falling of fruits in that plants.

~~20/11/2021~~

BIPPO'S
notes