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 from, weight and diameter.

Hormones:-

The substance that cause the growth and differentation process are called growth regulation or growth hormones.

The plant hormones are organic compound produced within the plant body and regulates 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 promotes the growth of very low concentration.
4. They are organic in nature.
5. They are used in extremly 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 Cold petiole curvature test and found that auxin included ___ growth in plant. It is synthesis in the colapetiole tip and trans located downward produced cell elongation without division.

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

Role of auxin:- ∴ S.G.

i. Cell elongation:-

Cell elongation is the most important function of auxin which 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. Rest formation:-

Auxina promotes root formation in cutting ends of plant parts.

iii. Flower initation:-

NAA (Naphthalene acetic acid) and 2,4-D are used to induced flowering in litchi and pinsapple.

iv. Parthenocarpy:-

Application of auxin like IAA (Indole acetic acid) and IBAC (Indodole butyric acid) to unpollinated flower pistil makes than develop into seeds fruits 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 inhabits the development of lateral bud.

vi. Controlling abscission.

Abscissons means flatting of leaves or fruits. Auxin in the abcission zone prevent the formation of abscision 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 initation 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~~ Cytokinins synthesis in the dividing cells like fruits seeds and embryo of plants.

P.T.O

S.Q Role of cytokinine

i) cell division - The important role of cytokinine is to induced cell division in plant specially in the presence of auxin.

ii) cell enlargement - cytokinine 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 synth - esis.

v) Delay senescene - Application of cytokine delay senescene to ext ract plant parts.

vi) Contraction of apical dominance - Application of cytokinine promotes the growth of lateral buds.

vii) Promotes cell differentiation - cytokinine play an important role in the initation of plant organisa in callus.

→ High concentration of cytokinine and auxin ratio induce shoot formation.
→ Low concentration of cytokinine and auxin ratio induce root formation.
→ Moderate concentration of cytokinine and auxin ratio induce booth root and shoot formation
→ Moderate concentration of cytokinine and less concentration of auxin ratio induce 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 Bakane 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, tip and developing seed. they move in all direction through both xylem and phloem.

Role of Gibrellin:-

1. Stem and leaf growth: Gibberellin 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 gibrellines.

3. Flowering:- It promotes flowering in long day plant during non-induction process.

4. Sex expression:- Gebberellin promotes the male flower on genetically female plant of cucurbita.

5. Parthenocarpy:- like auxin, gebberelline also induce the formation of seedless fruits.

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6. Bolting in rossette plant:- Bolting is the elongation of reduced stem such as cabbage, cauliflower, Internode, growth or length is very short ginning rossette appearences. Application of Gibberellines increase internode length in that plant

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