

UNIT IV : PLANT PHYSIOLOGY

10. PLANT GROWTH AND DEVELOPMENT

1 VSAQ + 1 SAQ [2 M + 4M = 6 M]

ROOT POINTS

- Growth** is an irreversible, permanent increase in the size of an organism or its parts or cells.
- Main contents of this chapter :**
 - Growth
 - Differentiation, Dedifferentiation and Redifferentiation
 - Development
 - Plant growth regulators
- Animals** stop growing after maturity.
- But in higher plants, **roots, stems and branches** have **non-stop growth**.
- While other organs like **leaves, flowers and fruits** show limited or **definite growth**.
- Growth is an irreversible, permanent increase in size of an organism or its parts or even of an individual cell. [VSAQ]
- Water, oxygen and nutrients are the essential conditions required for **growth**. [VSAQ]
- Plant growth** and development is affected by **light, temperature**, nutrition, oxygen etc.
- Growth can be **arithmetical or geometrical** based on the **cell division in root**, shoot.
- There are three principle phases in growth – **lag, log and senescent phases**.
- The changes that an organism goes through during its life cycle is called **development**. [VSAQ]
- Plasticity** is the ability of plants to follow different pathways, in response to the environment or phases of life, to form different kinds of structures. [VSAQ]
- The **inability** or delay of seed to **germinate** or grow is called **seed dormancy**. [IPE]
- Auxins** are powerful **growth hormones** produced in the **stem tips** of plants. [IPE]
- Auxins are responsible for apical dominance. [VSAQ]
- Apical dominance** is the suppression of growth of lateral buds by the activity of terminal bud.
- In stem cuttings, initiation of roots is widely used for plant propagation in **horticulture**. [SAQ]
- Auxins** stimulate fruit growth in tomatoes. [SAQ]
- "**Bakane**" is foolish seedling disease of rice seedling. [VSAQ]
- Bakane is caused by a fungus called **Gibberella fujikuroi**. [VSAQ]
- Bolting** is the **elongation** of internodes just before flowering. [VSAQ]
- Gibberellins** are responsible for bolting. **Ex:** Beet, Cabbage [VSAQ]
- Gibberellins are growth hormones that stimulate **fruit ripening, stem elongation, termination, flowering, sex expression, enzyme induction, Leaf & fruit senescence**. [SAQ]

24. **Gibberellins** increase the length of the axis, thus used to increase the length of grape's stalks.
25. **Cytokinins** are a class of plant growth hormones that promote cell divisions in plant roots.
26. **Cytokinins** promote cell divisions in plant roots. [SAQ]
27. **Cytokinins** help to produce new leaves, chloroplasts in leaves, lateral shoot growth and adventitious shoot formation. [SAQ]
28. **Ethephon** is the most widely used compound as a source of ethylene. [VSAQ]
29. Ethephon hastens **fruit ripening** in tomatoes and apples and accelerates abscission in flowers and fruits.
30. **Ethephon** promotes female flowers in cucumbers, there by increasing the yield. [VSAQ]
31. **Ethylene** is a simple gaseous plant growth regulating hormone. [SAQ]
32. Ethylene promotes senescence and abscission of leaves and flowers. [SAQ]
33. **Ethylene** is effective in **fruit ripening**. [SAQ]
34. **Respiratory climactic** is the rise in the rate of respiration during ripening of the fruits Ethylene is responsible for it. [VSAQ]
35. ABA stimulates the closure of stomata in the epidermis and increases the tolerance to plants for various kinds of stresses, so called a stress hormone. [VSAQ]
36. During seed germination its stored food is mobilized by **gibberellin**. [NEET-2013]
37. **Abscisic acid** growth regulator is known as 'stress hormone'. [NEET-2014]
38. Auxin can be bioassayed by **Avena coleoptile curvature**. [NEET-2015]
39. Typical growth curve in plants is **sigmoid**. [NEET-2015]
40. Phytochrome is a **chromoprotein**. [NEET-2016]
41. The avena curvature is used for bioassay of **IAA**. [NEET-2016]
42. Fruit and leaf drop at early stages can be prevented by the application of **auxins**. [NEET-2017]
43. One of the commonly used plant growth hormone in tea plantations is **indole-3-acetic acid**. [2010 PMT]
44. '**Auxin & Ethylene**' can be applied artificially to induce flowering in pineapple plant throughout the year to increase yield. [NEET-2019]
45. The process of growth is maximum during **log phase**. [NEET-2020]
46. The plant hormone used to destroy weeds in a field is **2,4-D**. [NEET-2021]
47. **Auxin** does not affect mature monocotyledonous plants. [NEET-2024]
48. Formation of interfascicular cambium from fully developed parenchyma cells is an example for **Dedifferentiation**. [NEET-2024]
49. **Cytokinin** is the phytohormone that promotes nutrient mobilization to delay leaf senescence. [NEET-2025]