Use of Growth Regulators in Fruit Production

• Plant bio-regulators, both natural and synthetic affect growth and development processes in plants.

• Plant growth regulators refer to organic compounds other than nutrients which in small quantities promote, inhibit or otherwise modify any plant physiological process.

• Plant hormones refer to bio-regulators produced by the plant which usually move within the plant from the site of production to the site of action and regulate plant physiological process at very low concentration.
Uses

• **Propagation:** Gibberellins are used for seed germination and substitution of chilling requirement.
  – Rooting of cuttings
    • 100-500 ppm IBA for soft wood
    • 500-1500 ppm for semi hard wood
    • 2000-5000 ppm for hard wood
  – GA has antagonistic effect on rooting of cuttings.
  – Root initiation in layered plants
• **Use in Tissue culture:**
  – In banana, low conc. of IAA and high level of BA essential for rapid growth of explant.
  – In grapes, BA and NAA for establishment of explants
  – IBA helps in rapid multiplication.

• **Breaking of seed and bud dormancy:**
  – GA used for accelerated seed germination in citrus, aonla, grapes, ber, Annona, apple, peach etc.
  – In pecan, GA significantly reduced/substituted the period of seed stratification.
  – GA sprays for termination of rest period of buds in peach and apple
  – Use of dormax for substitution of chilling in Kiwi and pecan.
• Control of Vigour:
  – SADH/ paclobutrazol effective in reducing the growth of pear, peach, lemon, apple, litchi, apricot, plum and mango.
  – Ethrel treatment beneficial in mango, grapes and avocado.

• Flowering:
  – Ethylene responsible for flowering in pineapple.
  – Acetylene, calcium carbide, ethephon and NAA(10-15 ppm) used to induce flowering in pineapple.
  – Soil application of paclobutrazol (cultar) @ 5 g per tree is effective in regulating fruiting in mango.
  – In litchi, NAA replaces girdling for improved flowering.
  – SADH promotes flowering in apple, pear, peach and blueberry.
  – Grapes and lemon respond to CCC with increased flowering.
• Inhibition or delay of flowering:
  – In fruits like apple, pear, fig, grapes etc. GA application produce parthenocarpic fruits.
  – Cytokinin in grapes for parthenocarpic fruit set.
  – Application of GA increases fruit set in strawberry, peach, plum and cherry.

• Fruit Thinning:
  – NAA application at post bloom for thinning in apple.
  – DNOC (sodium 4,6-dinitro-o-cresol) in stone fruits.
  – Pre-bloom application of GA for optimum fruit set and loose and attractive clusters in grapes.

• Fruit growth and maturity:
  – Post bloom application of CPPU, a derivative of cytokinins to increase the berry size in kiwi.
• **Prevention of Fruit drop:**
  – NAA, 2,4-D and 2.4.5-T for controlling fruit drop in mango and citrus.

• **Harvesting:**
  • Ethrel sprays for induced harvesting in walnut, pecan, olive, cherry and grapes.

• **Improvement of fruit quality:**
  – GA$_3$ for loose clusters, decrease fruit set, reduce number of berries per cluster increase size of remaining berries and improvement of berry size in grapes. GA$_3$ (50-100 ppm), NAA (25-50 ppm).
  – Dipping bunches in GA$_3$ (75 ppm) for 10 seconds for size improvement in grapes.
• **Fruit Ripening:**
  – Ethrel application in apple for uniform ripening and early fruit maturity.
  – Ethephon in citrus prior to storing ensures post harvets degreening.
  – In lemons, dipping in 1000 ppm ethephon for attaining markettable yellow colour.
  – For ripening of banana, mango etc.