Agri Articles
(e-Magazine for Agricultural Articles)
Volume: 04, Issue: 05 (SEP-OCT, 2024)
Available online at http://www.agriarticles.com
©Agri Articles, ISSN: 2582-9882

Role of Plant Growth Regulators in Cucurbits

(*Shivani, Aakanksha Thakur and Shiv Pratap Singh)
Dr. Y.S. Parmar University of Horticulture and Forestry, Nauni, Himachal Pradesh, India
*Corresponding Author's email: shivanisoni1706@gmail.com

Cucurbits belong to the family cucurbitaceae and form an important and large group of vegetables, grown extensively throughout India and other tropical and sub -tropical regions of world. Cucurbits, such as cucumber and chow-chow (chayote), are grown in greenhouses and outdoors in temperate countries. Cucurbit fruits can be eaten fresh as a dessert (muskmelon and watermelon), in salads (cucumber and long melon), cooked (bottle gourd, bitter gourd, sponge gourd, ridge gourd, summer squash, squash melon, pumpkin), pickled (gherkins, pointed gourd), jammed (pumpkin), or candied (ash gourd).Cucurbits with tough rinds, such as bottle gourd and summer squash, are used for various purposes, including containers, cutlery, musical instruments, and ornaments. Sponge gourd dry fruits make effective scrubbing pads. Colorful ornamental gourds in various forms and sizes serve as decorative items. Cucurbits are annuals that are sown directly and propagated from seed.

Plant growth regulators are substances that either occur naturally or are synthesized and are primarily present in low dosages that influence the metabolic or developmental processes of higher plants. In the United States, plant growth regulators were first used in agriculture in 1930. Charles Darwin's and his son Francis Darwin's experiment served as the catalyst for the discovery of important plant growth regulators. After a series of studies and observation of the canary grass's coleoptile development toward the light source (phototropism), they came to the conclusion that there is a transmittable substance present that affects the canary grass's growth toward the light. Later, F. W. Went isolated that molecule, which is today known as auxin. Gibberellins, or gibberellic acid, found in uninfected rice seedlings and was reported by E. Kurosawa. F. Skoog and Miller discovered kinetin (cytokinins), a growth-promoting chemical.

Effect of Plant Growth Regulators in Cucurbits

Plant growth regulators have a significant impact on cucurbits. They have the ability to alter sex expression, enhance fruit set, and eventually raise the production of cucurbits. Several growth-regulating substances, such as GA3, 2,4-D, and NAA, affect sex expression in different cucurbits, which can either increase the amount of female flowers or inhibit the number of male flowers. On lateral branches, the growth regulators reduce the quantity of male flowers. As a result, they eventually raise the yield by increasing the development of female flowers on lateral branches.

Muskmelon

Application of 250ppm of ethylene to muskmelon promotes fruiting, which increases yield. In gynoecious muskmelon, exogenous administration of silver thiosulphate (300–400ppm) stimulates the male flower. It is recommended to apply these chemicals/plant growth regulators twice, first at the 2-true leaf stage and again at the 4-true leaf stage.

Cucumber

In Cucumber application of 150–200ppm of ethylene enhances the amount of female flowers, promotes fruit-set, and ultimately boosts fruit yield. In gynoecious cucumber, growth regulators like GA (1,500–2,000ppm) and chemicals like silver nitrate (200–300ppm) cause the male flowers to appear. These chemicals or plant growth regulators must be applied at the 2-true leaf stage, then repeat at the 4-true leaf stage.

Watermelon

To boost fruiting and yield in watermelon, chemicals like 2,3,5-Tri-idobenzoic acid (25-250ppm), Boron (3-4ppm), Molybdenum (3-4ppm), and Calcium (20-25ppm) should be used exogenously at 2-true leaf stage. Repeat the spray at the 4-true leaf stage.

Bottlegourd

To enhance fruit set, spray plants with Ethrel (100-150ppm), Maleic hydrazide (400ppm), 2,3,5-Tri-idobenzoic acid (50ppm), Boron (3-4ppm), and Calcium (20ppm) twice at the 2 and 4-true leaf stages. Maintaining proper soil fertility can boost yield, especially for hybrid crops. At 400ppm, Maleic hydrazide combined with 100kg N/ha enhances female flower formation, increasing fruit set and yield.

Bittergourd

The application of growth regulators at the 2-4 leaf stage has a significant impact on sex expression and the sex ratio. At 50-150ppm of MH and 50-100ppn of CCC, there is an increase in female to male flowers ratio but at high concentration of 200 ppm it is reduced. Ethrel @ 25ppm increases female flowers. GA @ 60ppm reduces the ratio of female to male flowers. Applying MH @ 150-250ppm at the 2 -true leaf stage to the 'Pusa Do Mousmi' variety resulted in the production of pistillate flowers at the lowest nodes. Seed treatment with B9 @ 3-4 ppm for 20 hours resulted in the highest female flowers per plant. Soaking seedlings in Ethrel (20 ha/ppm) or GA3, MH, silver nitrate @ 4ppm produced the most female flowers and fruits per plant. Seed treatment with Boron @ 3-4mg/l or foliar treatment @ 3-4mg/l resulted in significantly higher yield. The application of cycocel @ 250mg/l resulted in the highest dry matter, acetic acid, TSS content, and flesh thickness.

Pumpkin

Ethrel can boost female flower production, leading to higher yield. The concentration of the chemical is crucial. The ideal concentration is 250ppm (2.5ml of Ethrel per 10 liters of water). The first spray must be applied at 2-true leaf stage.

Ridgegourd and Spongegourd

These crops have separate male and female flowers on the same plant. Exogenous growth regulators can be used to regulate the sex ratio. NAA @ 200ppm boosts female flower production in ridge gourd, significantly increasing yield. Exogenous treatment of Ethrel @ 250ppm has been found to be beneficial for sponge gourd.