


Four green bitter melons are positioned at the corners of a large white rectangular area. In the center of this area is a list of bullet points.

- Cucurbits show a wide range of variation in sex forms.
- Each spp. Of cucurbitaceae is characterized by a specific sex expression but variation occur.
- For example, *Cucumis melo* is typically andromonoecious but some cultivar are monoecious.
- Hermephroditism is considered to be a primitive form of sex expression in cucumber and muskmelon.
- **Monoecy**
 - It is the advanced form of sex expression in which staminate and pistillate flowers are separately produced in the same plant e.g. cucumber, bottle gourd, bitter gourd, pumpkin, squashes, red gourd and sponge gourd.

- **Trimonoecious**
- There is another sex form that is highly unstable and not true breeding called trimonoecious or gynodioecious from where staminate, pistillate and perfect flowers are produced in varying proportions on the same plant.
- Such form is found within some spp. of *Momordica* and is considered to be the form from which monoecious plants have been evolved.
- Some members of the Cucurbitaceae show the dioecious sex form where staminate and pistillate flowers are produced at separate plants e.g. pointed gourd, ivy gourd and kakrol (*Momordica dioica*) are the cultivated cucurbits that exhibit this type of sex form.



Physiology of Sex Expression

- Development of male and female flowers in *Cucumis setivus* is controlled by the level of an ovary-inducing substance.
- High level of this substance results in the development of pistillate flowers.
- Low level led to the staminate flowers.
- Intermediate level results in hermaphrodite flowers.
- The concentration of different growth regulators also play an important role in production of different sex expressions in cucurbits.
- For example, NAA increase size of female flower buds and decrease size of male flowers while Absciscic Acid has opposite effects. NAA induced femaleness by increasing the size of pistillate buds whereas GA and ABA induced maleness by increasing the size of staminate buds.

Modification in Sex Expression

There are various factors which contribute in sex expression modification of cucurbits especially cucumber.

- Day Length
- Radiation
- Temperature
- Growth Regulators
- Chemicals
- Mineral Nutrition

Effects of Day Length on Sex Expression

- Day length also play an important role in the evolution of different sex forms.
- Short days promote femaleness because maximum is ethylene is produced during short days and ethylene is responsible for femaleness.
- During long days, less ethylene is produced that's why increasing maleness and decreasing femaleness.
- Cucumber receiving 16 hr daylength didn't flower. Plants receiving 8 hr light favoured female flower production.
- In long melon, 8 hr induced maximum no of female flowers as compared to 12 or 16 hr day length.
- In bitter melon, 12 hr daylength favoured female flower production while 16 hr favoured male flower production.

Effects of Radiation on Sex Expression

- Beside the day length, radiations such as gamma rays and neutrons influence sex expression in cucurbits especially in cucumber.
- For example, rays between 500-1500 kR increase the proportion of female flower in cucumber.
- Seeds of *Cucumis melo* exposed to 1 kR gamma rays increased hermaphrodite flowers while 2.5 kR decreased the number of staminate flowers.

Effect of Temperature on Sex Expression

- High temperature promotes the male flower production in cucurbits while low temperature favours the female flower production.
- In watermelon and snap melon, the sex ratio is narrow in rainy season than in summer season.
- In watermelon, snap melon and long melon sex ratio decrease with rise in temperature during summer from an average 28.9-34.3 C.
- Even in ashgourd, short day length, low temperature and high relative humidity as well as cloudiness enhanced pistillate flower production.

Effect of Chemicals other than Growth

Regulators on Sex Expression

- Some chemicals other than growth regulators also influence the sex expression such as Asafetida, Silver compounds such as silver nitrate and silver thiosulphate.
- Asafetida spray (0.1%) increased the number of female flowers and fruit set in bottle gourd. It also increase the ratio of female:male flowers in bottle gourd and pumpkin.
- Silver ions are more effective in inducing staminate flowers on gynoecious cucumber.
- Silver thiosulphate (100-400 ppm) spray can induced hermephrodite flowers on gynoecious muskmelon.
- The application of nucleic acid bases also play a role in modification of male female flower ratios.

Effect of Growth Regulators

- In monoecious cucumbers GA (10 ppm), MH (100-200 ppm) NAA (50 ppm) and IAA (200 ppm), all increase the no. of male flowers produced at lower nodes and reduced the no. of female flowers in monoecious cultivars.
- Higher conc. of MH (800 ppm) and NAA (1000 ppm) induced the highest male:female flowers ratio.
- Etherel (400 ppm) increased no. of female flowers at lower nodes in cucumber.
- GA produced male flowers at 1st node and enhanced there amount.

Effect of Mineral Nutrition on Sex Expression

- Different nutrients Na, N, P, K, Ca also responsible for sex modification in cucurbits especially cucumber.
- Application of N @ 80Kg/ha increased the no. of female flowers and reduced the male flowers in cucumber.
- Application of N @ 120 and 180 Kg/ha altered the female:male ratio to 1:21 and 1:17 respectively from 1:42 in normal plants of muskmelons.
- Application of Ca and B also increase the no. of female flowers in cucumber.